A TAXONOMIC STUDY OF LECHEA

ALBION R. HODGDON

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6. L. TENUIFOLIA Michx. Caudex mostly reduced, hardly if at all branched: basal shoots 3–7 cm. long, bright-green, slender, often numerous and much branched, forming dense mats, the axis sparsely subappressed-pilose with fine hairs; leaves crowded, very numerous, glabrous, bright-green to lustrous above, subappressed- to somewhat spreading-pilose beneath on midrib and margin, narrowly lanceolate or oblanceolate to linear, 4–6 mm. long, 1 mm. or less in width, on young shoots frequently verticillate, later subapproximate or scattered: fruiting stems 1 to several, 12–40 cm. high, frequently low, openly spreading-branched mostly from below the middle, forming a subglobose to broadly spire-shaped inflorescence: young shoots and branches at first densely pilose, becoming sparsely and finely subappressed-pilose in maturity: cauline leaves scattered, linear to linear-subulate, acute, obscurely petioled, glabrous above, appressed-pilose beneath on midrib and margin, casually so elsewhere, mostly caducous, 0.8–2 cm. long, 1–1.5 mm. broad; rameal leaves much smaller, mostly persisting throughout the season: fruits racemose, frequently secund on the secondary branches, occasionally clustered, mostly subappressed: pedicels slender, mostly shorter than the calyx, 1–1.5 mm. long: calyx subglobose, broadest near the base, exceeding and completely enclosing the capsule, 1.6–1.9 mm. long; inner sepals strongly spreading-pilose, dull-green, ovate, subacute, the main vein alone prominent, forming a keel dorsally; outer sepals bright-green, leaf-like, narrowly lanceolate to linear, acute, 2–3 mm. long, 0.3–0.5 mm. broad, equaling to greatly exceeding the inner: capsule broadly ovoid, broadest near base, 1.4–1.7 mm. long, 1.3–1.5 mm. broad; valves but slightly spreading in maturity: seeds dull, yellowish- to reddish-brown, plump, broadened and greatly thickened toward the base, abruptly subacute to pointed at apex, mostly 2-sided, strongly convex dorsally, 2 in number and small (0.7–0.9 mm. long) or 3 and larger (0.9–1 mm. long or slightly longer), rarely 4–5 and ventrally keeled with 2 lateral faces.—Fl. Bor.-Am. i. 77 (1803); Pursh, Fl. Am. Sept. i. 91 (1814); Elliott, Sk. Bot. S. Car. & Ga. i. 185 (1816); Smith in Rees, Cycl. xx. (1819); Dunal in DC. Prodr. i. 286 (1824); Eaton, Man. 271 (1829); Dietr. Syn. Pl. i. 416 (1839); Leggett in Bull. Torr. Bot. Cl. vi. 251 (1878); Chapman, Fl. So. U. S. ed. 2, Suppl. 2: 678 (1892); Britton in Bull. Torr. Bot. Cl. xxi. 249 (1894); Robinson in Gray, Syn. Fl. N. Am. i^{1}. 193 (1895); Britton in Britton & Brown, Ill. Fl. ii. 443, fig. 2479 (1897); Chapman, Fl. So. U. S. ed. 3: 37 (1897); Britton, Man. 632 (1901) and subsequent editions; Small, Fl. Se. U. S. 799 (1903); Grosser in Engler, Pflanzenr. iv^{193}. 137 (1903); Robinson & Fernald in Gray, Man. ed. 7: 578 (1908); Small, Man. 882 (1933).

L. minor sensu Torrey, Fl. N. & Mid. St. 160 (1824); sensu Chapman, Fl. So. U. S. ed. 1: 36 (1860) in part; probably of other early American authors in part; not L. *L. minor* vars. β. and γ. Torrey & Gray, Fl. N. Am. i. 153 (1838); *L. minor* var. *dumosa* Torrey, Fl. N. Y. i. 79 (1843). *L. thesioides* Spach in Hook. Comp. Bot. Mag. ii. 285 (1836). *L. secundiflora* Rafinesque, New Fl. N. Am. i. 95 (1836).—Rocky or dry woods and hills, mostly inland, and on foothills and lower mountains of the Appalachian System and on the Ozark Plateau: southern Maine and New Hampshire (where rare) to South Carolina, west to southeastern Minnesota, eastern Nebraska, Kansas, Oklahoma and Texas. Because of the sharply defined character of this species throughout the Eastern States it is quite unnecessary to indicate specimens from this area. In Illinois, where the var. *occidentalis* occurs, and in the states west of the Mississippi River, where the possible occurrence of the variety could lead to misidentifications, I shall include representative specimens. Illinois: Oregon, Ogle Co., September 23, 1887, *M. B. Waite* (US); dry sandy soil, common, Braidwood, July, 1927, *Clute* (NY); dry sandy slopes or rocky banks, St. Peter's Sandstone, Utica, July 13, 1901, *E. J. Hill*, no. 137; sandy opens, Starved Rock Park, *F. W. Johnson*,. no. 1926 (NY); sand hills, Kankakee, July 25, 1873, *E. J. Hill* (NY); sandy barrens near Oquawka, May and October, 1874, *Patterson* (Field); sandy soil, Athens, Mason Co., 1861, *E. Hall* (Field); in woods on dry bluff, Cedar Glen, Hancock Co., *F. C. Gates*, no. 10,112 (Field); open ground, sterile soil, Parkersburg, Richland Co., *E. J. Palmer*, no. 15,624 (Mo); rock-barrens, Makanda, June 12, 1903, *Gleason*. Minnesota: opposite Hudson, Wisconsin, St. Croix River, July 22, 1890, *Holzinger* (NY). Iowa: Wild Cat's Den, Mount Pleasant, Muscatine Co., August 1891, *J. H. Mills;* dry soil, infrequent, Van Buren Co., August 1, 1896, *J. T. & M. F. L. Fitzpatrick* (Field). Missouri: River Heights, near Hannibal, Marion Co., July 23, 1919, *J. Davis* (Mo); dry open woods, east of Bethel, Shelby Co., June 29, 1933, *Palmer & Steyermark*, no. 40,910 (NY); sandy woods, local, south of Sui Mills, Jackson Co., *Mackenzie*, no. 515 (NY); Pacific, *E. E. Sherff*, no. 995 (Field); Bismark, September 10, 1893, *Bush* (Mo); on dry sandy roadsides, Vernon Co., July 16, 1873, *G. Broadhead* (Mo); Shannon Co., July 24, 1891, *Bush* (Mo); post-oak woods, vicinity of Strafford, Greene Co., *P. C. Standley*, no. 9431 (US); common in sandy and dry soil, 13 miles northwest of Joplin, *E. J. Palmer*, no. 266; common, Montier, *Bush*, no. 56 (NY); Poplar Bluffs, August 15, 1875, *Letterman* (Mo); dry open woods, Willow Springs, Howell Co., *E. J. Palmer*, no. 6229 (Mo); dry soil, McDonald Co., *Bush*, no. 17A. Arkansas: dry open ground, Beaver, Carroll Co., *E. J. Palmer*, no. 6369 (Mo); Benton Co., 1899, *Plank* (NY); dry sandy slopes, London, Pope Co., *E. J. Palmer*, no. 8163 (NY); Big Creek, Sebastian Co., *Demaree*, no. 3125 (US); Fort Smith, 1853–54, *J. M. Bigelow* (US); dry open woods, Pulaski Heights, Little Rock, Pulaski Co., *Demaree*,

no. 8121; moist flat woods, Fulton, Hempstead Co., *E. J. Palmer*, no. 12,679 (NY); near Texarkana, Miller Co., alt. 300 ft., *A. A. & E. G. Heller*, no. 4154. LOUISIANA: dry woods, Natchitoches, June 10, 1915, *E. J. Palmer*, no. 7948 (NY); hill top at Fort Bulow, vicinity of Alexandria, *C. R. Ball*, no. 538; vicinity of Covington, *G. Arsène*, no. 11,816 (US). KANSAS: Galena and vicinity, 8 miles south of town, *Rydberg & Imler*, no. 272 (NY). OKLAHOMA: vicinity of McAllister, May 16, 1883, *Oyster* (Mo); open sandy land, near Grant, Choctaw Co., *H. W. Houghton*, no. 4017. TEXAS: dry prairies, Bowie Co., June 13, 1898, *Eggert* (NY); in sandy woods, Greenville, June, 1913, *D. A. Saunders* (NY); near Paris, Lamar Co., *A. A. & E. G. Heller*, no. 4213 (US); common on hills, Marshall, *Bush*, no. 1013 (Mo); Comanche Spring, June, 1849, *Lindheimer*, no. 678: Weatherford, *Tracy*, no. 8059 (Mo); Troup, June 8, 1927, *L. McGregor*, no. 7183 (US); sandy woods, Granbury, *Reverchon*, no. 52 (Mo); Hempstead, *E. Hall*, no. 32; prairie, near Houston, June, 1892, *Lindheimer;* New Braunfels, June, 1850, *Lindheimer*, no. 677. PLATE 489, FIGS. 5, 6 and 7; MAP 8.

Var. **occidentalis,** var. nov. Habitu varietati typicae similis sed parum robustior ramis erectioribus; folia basilaria et caulina viridia sed opaciora et dorso densius pilosa; fructus latior et longior; sepala interiora 1.9–2.2 mm. longa; sepala exteriora interiora valde superantia; capsula 1.7–2.1 mm. longa late ovoidea vel elongato-ovoidea; valva sepala interiora subaequans; semina 2–4 (plerumque 2) pallide brunnea crassa magna (1–1.2 mm. longa) ca. 0.55–0.7 mm. lata parum inaequilateralia dorsiventraliter compressa.—Dry woods, sandy places and rocky slopes, south-central Nebraska, central Kansas and Oklahoma to central and eastern Texas but not on the Coastal Plain, also in several scattered localities in northern Illinois. I have seen the following specimens. ILLINOIS: Fountaindale, Winnebago Co., *Bebb* (Field); Dixon, *Vasey;* in sandy woods, Peoria, July, 1895, *F. E. McDonald* (Mo). NEBRASKA: Minden, September, 1897, *Hapeman* (NY). KANSAS: Pottawatomie Co., August 30, 1895, *J. B. Norton*, no. 30 (TYPE in Gray Herb.); sandy hills, St. George, August 13, 1895, *Norton*, no. 375 (NY); Stafford Co., *M. A. Carleton*, no. 299 (US). OKLAHOMA: on dry rocky ledges, near Pawhuska, Osage Co., *G. W. Stevens*, no. 2004; common, Sapulpa, Indian Territory, *Bush*, no. 1357 (NY); dry rocky sandy clay cliff, 1 mile west of Oilton, Payne Co., *R. Stratton*, no. 89 (Mo); Lincoln Co., July 26, 1895, *L. A. Blankinship;* roadside, 1 mile south of Luther, Oklahoma Co., *R. Stratton*, no. 271 (Mo); 3 miles west of Kendrick, July 19, 1905, *A. H. Van Vleet* (US); Pottawatomie Co., August 8, 1900, *P. J. White*, no. 91 (Mo); Davis, *W. H. Emig*, no. 674 (Mo); chiefly on the False Washita between Fort Cobb and Fort Arbuckle, Indian Territory, 1868, *Edw. Palmer* (NY); on mountain side, near Cache, Comanche Co., *G. W. Stevens*, no. 1336½; gravelly soil among rocks, Wichita Mountains, Indian Territory, *C. G. Sheldon*, no. 205 (Mo). TEXAS: on the Sabi-

nas, on rocks, July, 1847, *Lindheimer* (Mo); in sandy pasture land, growing with *L. villosa*, Tarrant Co., *Ruth*, no. 399 (NY); rocks, Palo Pinto Co., August 17, 1877, *Reverchon*, no. 782 (NY); on sandstone rocks, Stephens Co., August 17, 1877, *Reverchon*, no. 782; on sandstone rocks, Eastland Co., August, 1876, *Reverchon*, no. 2320 (Mo); granite glades, Granite Mountain, Burnet Co., *E. J. Palmer*, no. 10,267 (Mo); Enchanted Rock, Llano Co., June 1, 1930, *Tharp & Whitehouse*, no. 86,950 (mixed with *L. san-sabeana* and distributed as *L. tenuifolia*). PLATE 489, FIGS. 8 and 9; MAP 9.

On the basis of the type-specimen which is preserved in the Michaux Herbarium at Paris, the name *Lechea tenuifolia* stands for the plant under present consideration. Fernald, in 1903, saw the specimen and reported it to agree with our *L. tenuifolia*.

Elliott[1] cites "*L. juncifolia?* Walt." as a synonym of *L. tenuifolia*. Walter's description[2] is as follows, "foliis radicalibus teretibus, calyce nullo"; and *Index Kewensis* cites *L. juncifolia* as a synonym of *L. tenuifolia*, despite the fact that Torrey & Gray,[3] after quoting Walter, quite logically say it "is wholly unknown but doubtless belongs to some other order." Grosser,[4] in his treatment of *L. tenuifolia*, follows *Index Kewensis* in citing *L. juncifolia* and, in addition, he cites as a synonym Rafinesque's *L. verna*, which was not described in the latter's monograph[5] but only cited as a name, l. c. p. 92, along with *L. juncifolia* as a synonym of *L. tenuifolia* Michaux. All three of these Rafinesque includes in the subgenus "*Menandra*," which he describes, l. c. p. 90, as having, "2 short sepals or almost lacking," consequently having nothing to do with our *L. tenuifolia*. Rafinesque does, however, l. c. p. 95, describe *L. secundiflora*, which can hardly be anything else. Part of the description I quote, "leaves scattered, lax narrow linear . . . flowers remote secund, pedicels short." It is placed by Rafinesque in his subgenus *Eudiexa*, which has the external sepals longer than the internal. All of these characters belong to *L. tenuifolia* and the remainder of the description is not conflicting. Therefore the name belongs in the synonymy of *L. tenuifolia*.

Spach's description[6] of *Lechea thesioides* is exceptionally complete and accurate and his species belongs obviously to our *L. tenuifolia*.

[1] Sk. Bot. S. Car. & Ga. i. 185 (1816).
[2] Fl. Car. 83 (1788).
[3] Fl. N. Am. i. 154 (1838).
[4] Engler, Pflanzenr. iv[193]. 137 (1903).
[5] New Fl. N. Am. i. 89–98 (1836).
[6] Hooker, Comp. Bot. Mag. ii. 285, 286 (1837).

Lechea minor vars. β. and γ. of Torrey & Gray[1] are by their descriptions probably *L. tenuifolia.* However, there are specimens of *L. tenuifolia* labeled *L. minor* var. γ. in the Herbarium of the New York Botanical Garden; and presumably the type-specimen of this variety, mentioned as *L. tenuifolia* by Britton, is one of these, but among the specimens of *L. racemulosa* there are plants labeled *L. minor* var. *gracilis,* which is the name later given by Torrey[2] to the earlier var. α.

L. tenuifolia, while fairly constant in general habit and leaf-characters, varies strikingly in the seeds and capsules. Generally speaking there are two types, a smaller-seeded and -fruited form and one with larger fruiting parts. Both occur sporadically anywhere in the range, having no distinct ranges or other morphological characters which would enable one to split the species. A similar type of variation exists in *L. maritima* var. *typica;* and there again the two slightly differing types of plants permit of no classification along evident lines of geographical variation.

In and close to the Driftless Area and on the Great Plains and rolling uplands of Nebraska and from central and eastern Kansas to central Texas there occurs a distinct variety of *Lechea tenuifolia.* It differs from the typical form of the species in its woody and more extensive caudex, in its more striking pilosity (both of cauline and basal leaves) and particularly in its very long exterior sepals, large capsules and seeds. Its occurrence in northern Illinois in or near "the Driftless Area," at least 400 miles from the nearest station to the west, is particularly interesting. These Illinois stations (Winnebago Co., Dixon and Peoria) are included in the area which was covered by the Illinoian but not by the Wisconsin Ice.[3] Moreover, the first two stations are but a short distance, 30–50 miles, from "the Driftless Area." Reference to Antevs' map shows that the position of St. George, Kansas, the nearest station to the west, is on the border between the Kansan Drift and the entirely unglaciated area of the South and West where the remaining stations are located. The distribution appears to be definitely correlated with lack of glaciation and at the same time with a dry climate, since the variety is absent from southern Illinois and Missouri. The spread of the variety must

[1] Fl. N. Am. i. 153, 154 (1838).
[2] Fl. N. Y. i. 79 (1843).
[3] E. Antevs, Maps of the Pleistocene Glaciation in Bull. Geol. Soc. Am. xl. 645, fig. 6 (1929).

have taken place before the Wisconsin; otherwise it would occur in suitable intervening areas. That it survived the entire Pleistocene in the Driftless Area is also possible. At least, in the western part of its range it has failed to move far, even on to the Kansan Drift. Its very scattered distribution over a considerable area indicates, likewise, a considerable antiquity.

7. L. **mensalis**, sp. nov. Caudex plerumque simplex; rami basilares subprocumbentes vel adscendentes, 1–4 cm. longi dense subadpresseque pilosi; folia basilaria 3–5 mm. longa anguste linearia supra glabra subtus subadpresse pilosa praecipue in costa; folia caulina anguste linearia acuta 8–15 mm. longa 0.7–1.2 mm. lata subtus costa et margine sparse patuleque pilosa; caules floriferi numerosi 15–25 cm. alti graciles sparse patulo-pilosi praecipue supra medium ramosi, rami simplices vel furcati; fructus in racemos densos dispositi; pedicelli adpressi vel patuli 1.5–2 mm. longi subadpresse pilosi; calyx fructifer ovoideus 1.9–2 mm. longus 1.5–1.7 mm. latus capsulam superans et tegens; sepala interiora dense subadpresseque pilosa obscure carinata; sepala exteriora anguste linearia interiora aequantia; capsulae inaequilateraliter ovoideae subangulatae 1.6–1.8 mm. longae 1.2–1.3 mm. latae valvae subaequales obscure carinatae; semen 1, 1 mm. longum subaequilateraliter ovoideum sub apice dorsiventraliter compressum.—A single station in the Chisos Mountains of southwestern Texas. TEXAS: Chisos Mountains, July 28, 1931, *C. H. Mueller*, no. 8102 (TYPE in Gray Herb.), distributed as *L. tenuifolia* Michx. PLATE 489, FIGS. 1, 2, 3, and 4; MAP 10.

Lechea mensalis, while represented in herbaria only by the collection cited above, is one of the very distinct members of the genus. Its slender panicles of strongly ascending branches serve, at once, to separate it from the broadly spreading-branched *L. tenuifolia* or from the more strict *L. tenuifolia* var. *occidentalis*. Since the two latter have from 2–3 seeds borne in capsules which are about as broad as long, the contrast with *L. mensalis* becomes more marked, for it has a narrowly ovoid capsule bearing but 1 seed. That it is related to *L. tenuifolia* is shown by a combination of characters rather than by any single striking characteristic. *L. mensalis* has fruits borne on fairly long pedicels and arranged uniformly in racemes, calyces and capsules broader below the middle than above, cauline and basal leaves very narrow and the exterior sepals about equal in length to the inner.

The Chisos Mountains of southwestern Texas, where this *Lechea* was collected in 1931 by *C. H. Mueller*, are noted for the endemism and the breadth of relationship of their flora. They attain a sufficient

elevation to support on their flat summits a flora quite different from that of the surrounding desert areas. In the latter part of June, 1934, Mr. G. B. Rossbach and I climbed nearly to the plateau-like summit of Emory Peak (the highest point in the Chisos Mountains). At the point (slightly less than 2500 meters altitude) where we were forced by approaching darkness to turn back, the terrain, becoming mesophytic, began to appear suitable for the growth of Lecheas. It is probable that the specimen came from the extensive summit, in which case it would mark the upper limit in altitude for any member of the genus.

It seems very probable, in view of the very diversified geographic elements in the flora of these mountains, that their floristic history extends back many millions of years. *Lechea mensalis* is a single instance to suggest the antiquity of that flora.

The reduction of seeds per capsule to 1 is matched in the east by *L. patula*, *L. Deckertii*, *L. divaricata*, *L. cernua* and in a small proportion of capsules of *L. racemulosa*. The last, usually with 2 seeds but occasionally with only 1 in a capsule, has a broad range on the Coastal Plain and in the southern Appalachian Mountains. *L. patula* extends north from Florida to South Carolina. The remaining three species are confined to restricted areas in the Florida Peninsula. Of the species in the genus having numerous (3–6) seeds per capsule, *L. intermedia*, *L. villosa* (except var. *Schaffneri*), *L. minor*, *L. Leggettii* var. *typica*, *L. tenuifolia* (except in var. *occidentalis*), *L. Torreyi*, *L. maritima* (except in var. *virginica*) and *L. tripetala*, are the dominant species over most of the range of the genus. A reduction in the number of seeds appears almost to be an invariable accompaniment of extensive curtailing of range, since of very localized species only *L. san-sabeana* and *L. cubensis* (which is little known) have more than 1 or 2 seeds. Moreover, *L. san-sabeana*, which by the development of persistent and hard dissepiments has retained the potential capacity to produce 6 seeds, rarely produces perfect mature ones. The Florida species, *L. Deckertii*, *L. divaricata* and *L. cernua*, have developed extremely hard capsules which remain closed in maturity and in which there has even been a growing together of the valves of the capsule. Because these species grow in geologically ancient areas or in areas having old floras and are cut off by wide areas from their relatives or, as in some cases, are so distinct that it is difficult to say to what species they are related, I am of the opinion that the 1-seeded condi-

tion, possessed by them, is a natural consequence of segregation, specialized adaptation and old age.

8. L. DECKERTII Small. Plant low, 7–28 cm. high, pale-green, broadly globose- to subcylindric-paniculate, with fine wiry branches, mostly suffruticose, only the upper branches and the tips of the stem regularly dying back at the end of the season: true basal shoots lacking, the young shoots starting from any part of the shrubby plant: leaves of the young shoots linear, abruptly acute or obtuse, sparingly subappressed-pilose beneath on midrib and margin, glabrous above, 1.5–3.5 mm. long; leaves of the developing shoots crowded, numerous, similar, conspicuously pilose beneath, 3–6 (–7) mm. long; those of the mature shoots inconspicuously pilose on midrib and margin beneath, 1.5–5 mm. long, of the ultimate branches persistent, 1.5–2.5 mm. long: flowers scattered, few to fairly numerous: fruit maturing irregularly, scattered: pedicels slender, weak, 1–2 mm. long, sparsely and finely pilose to glabrous: calyx broadly (nearly horizontally) spreading, not at all enclosing the capsule; interior sepals elliptic-ovate to elliptic-obovate, obtuse, deeply concave, sparsely and finely pilose to glabrous, 1–1.2 mm. long; exterior sepals linear, from one-half to two-thirds as long as the inner: capsules lustrous, prominent, free from the calyx, subglobose, as broad as long, 1.2–1.5 mm. in diameter; the valves papery, not readily separating in maturity: seeds 1 (2), 0.8–1 mm. long, much enlarged at the base, the axis greatly curved, unequally 3-sided, the two lateral faces very unequal.—Torreya, xxvii. 103 (1927) and Man. 884 (1933). *L. myriophylla* Small, Man. 884 (1933).—Sand-hills and scrub, inland, south-central Georgia to southern Florida. The following are typical. GEORGIA: sand-hills of Seventeen Mile Creek, Coffee Co., *Harper*, no. 1461; sand-hills of Satilla River, Coffee Co., *Harper*, no. 1443 (NY). FLORIDA: scrub, Tavarese, June 29, 1893, *Rolfs* (Field); Killarney, September, 1889, *O. Vesterland* (US); sand-hills about Lake Jackson, *Small, Small & DeWinkeler*, no. 10,643 (NY); dunes, Highlands Co., August 29, 1934, *M. E. Baker* (NY) (as *L. myriophylla*); east of Sebring, De Soto Co., *Small & DeWinkeler*, no. 9772 (NY), the type of *L. myriophylla* Small; scrub, near Kuhlman, DeSoto Co., *Small & DeWinkeler*, no. 9799 (NY), as *L. myriophylla;* scrub, near Lemon City, *Small, Small & DeWinkeler*, no. 10,324 (NY); scrub, Lemon City, Dade Co., July, 1926, *R. F. Deckert* (TYPE, Herb. N. Y. Bot. Gard.). PLATE 489, FIG. 10; MAP 11.

The relationship of *Lechea Deckertii* is definitely with *L. patula*. The general habit and the leaves of both are similar. Furthermore, both have certain similarities of the fruits which are of diagnostic importance. The capsule of each is exserted far beyond the calyx which, in either species, is much reduced in size. The differences, however, are several of a fundamental nature. *L. Deckertii* has a

broadly spreading calyx of short exterior sepals and longer interior ones. The capsule is nearly globose and has thin papery valves. *L. patula* has a somewhat spreading to nearly appressed calyx of long exterior sepals and equal or shorter interior sepals, and the capsule is elongate-ovoid or elongate-obovoid, with firm to indurated valves.

The difficulty in identifying specimens of *Lechea Deckertii* is as great as in *L. patula*. Both species pass through similar stages of development of vegetative parts wherein strong contrast is shown between early and late conditions. Here, as in *L. patula*, Small has described as a new species a plant, in this case *L. myriophylla*, distinguished mainly on characteristics of the shoots during a period of strong vegetative development.

In the descriptions of *Lechea myriophylla* and *L. Deckertii*[1] the following differences are given: the leaves of the former are stated to be "3–5 mm. long, acute and somewhat loosely strigose or glabrous," those of the latter "1.5–2.5 mm. long, acutish, glabrous or nearly so." *L. Deckertii* is further described "panicles few–several flowered"; *L. myriophylla* as having "panicles many flowered"; finally the sizes of the capsules are given as "1.2–1.4 mm. long" for *L. Deckertii* and as "1.5 mm. long" for *L. myriophylla*.

From my comparisons of the type-specimens of *Lechea Deckertii* and *L. myriophylla* with many other sheets of *L. Deckertii* from several herbaria I find that *L. myriophylla*, the more recently described species of Small, represents merely a phase of *L. Deckertii* wherein a very considerable growth has taken place in the young shoots, accompanied by the development of comparatively large leaves. This is parallel with the situation in *L. patula*, in which different states of development of one species have led to the increase of useless synonyms. *L. Deckertii* varies, as might be expected, in the quantity of pubescence on the leaves. Some specimens, agreeing in most respects with Small's strict definition of that species, have leaves as strongly pilose as are those of his *L. myriophylla*. The size of capsules is similarly variable. I have seen no flowering or well developed "fruiting panicles" of *L. myriophylla* but those of *L. Deckertii* are frequently many-flowered.

The status of *Lechea Deckertii* as a distinct species is unquestionable. The characters of the few mature seeds which I have found in the capsules in conjunction with the other characteristics attest this.

[1] Small, Man. 884 (1933).

The one character (not mentioned by Small) which seems to support his *L. myriophylla* is its nearly glabrous calyx. But this character is not very reliable: in the New Jersey Pine Barrens several specimens have been collected of *L. Leggettii* var. *moniliformis* with perfectly glabrous calyces but in all other respects similar to characteristic specimens of that variety. Because of its sporadic occurrence in two separate species, unaccompanied by other and fundamental differences, I regard the total or almost complete loss of hairs from the calyces as a mutation which is confined to but a few plants and which will probably persist for only a short time within a species or variety. Several others of the rather limited number of specimens of *L. Deckertii* now to be found in herbaria could be thoroughly described as individuals (stressing the vegetative characters) to make about as distinct species as does *L. myriophylla* Small.

9. L. DIVARICATA Shuttleworth. Plant subherbaceous, the caudex multicipital, mostly subprocumbent: basal resting shoots lacking; the young shoots in late spring or summer mostly from near the base, immediately developing, densely villous on the axis: basal leaves few, scattered, alternate, densely villous beneath on midrib and margin, mostly glabrous above, lance-ovate to elliptic-lanceolate, acute to pointed, 2–3 mm. long: fruiting stems frequently numerous, slowly developing, mostly dying after fruiting, 25–60 cm. high, divergently and somewhat divaricately branched from near the base; the principal branches 15–30 cm. long: leaves absent from the main stem, abundant and crowded, mostly spreading on the branches, spreading-pilose to villous on the lower surface on midrib and margin, glabrous above, narrowly lance-ovate to elliptic-lanceolate, acute, 5–8 mm. long: secondary branches very short, mostly 1–3 cm. long, becoming little more than fruiting clusters upward: stamens numerous (15–25): fruits loosely to compactly clustered: pedicels stout, densely subappressed- to spreading-pilose, 1–1.5 mm. long: calyx strongly pyriform, broadly spreading above the very considerable (5–8 mm. long), pale obconic receptacle; interior sepals elliptic-ovate, obtuse, spreading-pilose to villous, 1.3–1.5 mm. long; exterior sepals narrowly lanceolate, two-thirds as long as the inner: capsule exserted, considerably exceeding the calyx, elliptic-ovoid, 1.8–2 mm. long, 1.6–1.7 mm. broad, lustrous; the valves indurated (very hard), coalesced, neither sharply defined nor separable in maturity: seeds 1–3 (–4), mostly 1 normal and mature, the others aborted and shrunken, 1.2–1.4 mm. long, mahogany-brown, with a thin white covering, broadest at the base, narrowing unequally upward to the apex, irregularly convex dorsally, concave to obscurely 2-faced ventrally, the endosperm dense, obscuring the embryo.—Shuttleworth ex Britton in Bull. Torr. Bot. Cl. xxi. 249 (1894); Small, Fl. 799 (1903) and Man. 883 (1933). *L.*

major var. *divaricata* Gray in Robinson in Gray, Syn. Fl. N. Am. i[1]. 192 (1895); Grosser in Engler, Pflanzenr. iv[193]. 137 (1903).—Sandy soil, mostly near the coast, central and southern Florida. The following specimens have been seen by me. FLORIDA: in dry sandy soil, Sanford, June 28, 1920, *S. Rapp* (NY); dry sandy soil, Eau Gallie, Indian River, *Curtiss*, no. 5709; Hernando Co., June–July, 1898, *A. S. Hitchcock* (Field); St. Petersburg, August, *C. S. Williamson* (NY); Manatee, June, 1878, *Garber;* in pinetis ad fl. Manate—Florida austr. occ., *Shuttleworth* (TYPE in Gray Herb.). PLATE 490, FIG. 1; MAP 12.

This very distinct species of *Lechea* has been variously misunderstood by students of the genus. Leggett,[1] speaking of *L. major*, our *L. villosa* Ell., said "I suspect the *L. divaricata* Shuttleworth from Florida is only a form of this with many stamens, 30 or more." Britton,[2] after briefly describing the plant, said, "I have not seen the radical shoots and am consequently uncertain of the alliance of the species but think there is little doubt of its near relationship to L. villosa." Among the specimens he cites is one from Texas, "*E. Palmer*, no. 2025." Robinson,[3] following Gray, made the combination *L. major* var. *divaricata* and cited among other specimens "Texas, *Palmer*" and "Mex., *Schaffner*" as belonging to it. Grosser, largely following Robinson's treatment, called the plant *L. major* var. β. *divaricata* and included Palmer's collection, no. 2025, from Texas, but eliminated the Mexican material of Schaffner. Small[4] gave the range as "Florida and Texas" and very recently[5] stated the range, "pen. Fla., also reported from Tex."

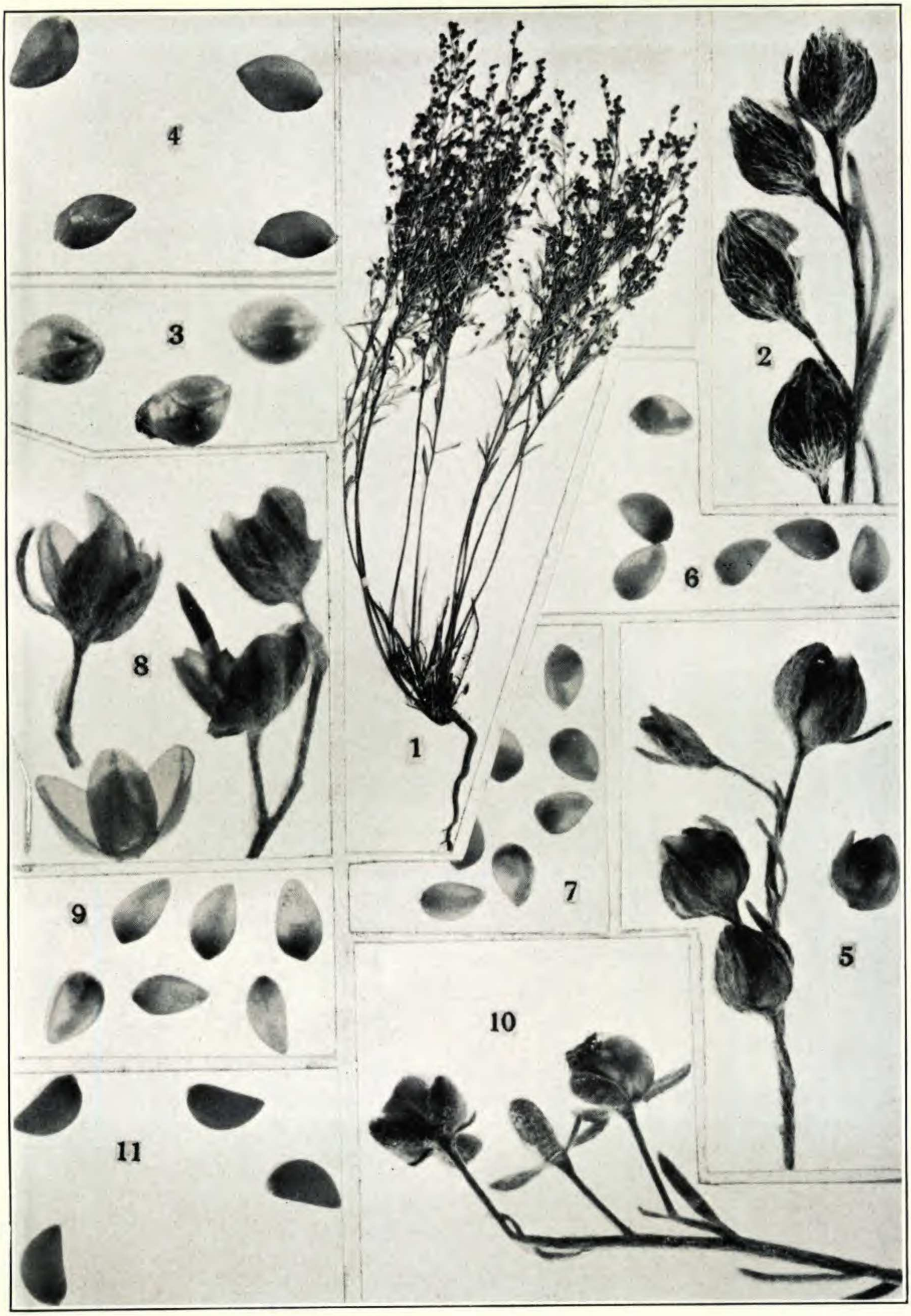
Probably a half-dozen differences exist between *L. villosa* and *L. divaricata*. The most distinguishing characters lie in the fruits and these are of a more fundamental order than are to be found among any of our northern Lecheas. First and most important, the capsule, which greatly exceeds the calyx, is extremely hard and indehiscent, the valves having quite coalesced. The one seed (occasionally more) is dark-brown, with a membranaceous coat, irregularly ovoid and very large. The leaves are always very small, never reaching 1 cm. long. It would be difficult to find any *Lechea* differing more from *L. villosa* in everything except quality of pubescence and the general shape of the leaves, both of which are vegetative characters and not in them-

[1] Bull. Torr. Bot. Cl. vi. 251 (1878).
[2] Bull. Torr. Bot. Cl. xxi. 249 (1894).
[3] Gray, Syn. Fl. N. Am. i[1]. 192 (1895).
[4] Fl. Se. U. S. 799 (1903).
[5] Man. 883 (1933).

selves necessarily indicative of close relationship. All of the authors mentioned above regarded pubescence in the genus as being of great importance. The obvious thing for them to do, then, was to relate the two species having strongly villous pubescence. The equally obvious consequence has been the inclusion in the species *L. divaricata* of certain peculiar growth-forms of *L. villosa*, the Texan specimen of *Palmer*, no. 2025, for example. Nothing but hopeless confusion will ever result from a classification of these plants by their vegetative characteristics alone.

In characters of fruit this species is closest to *Lechea Deckertii* and *L. patula*, all three having usually 1-seeded capsules which in the first two are of coalesced valves. *L. patula* has the valves partly united. The specialization, consisting of reduction in number of seeds and coalescing of valves, arrived at in *L. divaricata* probably accounts for the fact that it is not common.

10. L. RACEMULOSA Michx. Caudex short, mostly simple; basal shoots in August and September, spreading-ascending to suberect, in maturity frequently branched, 3–8 cm. long; the axes strongly spreading-pilose: basal leaves frequently verticillate, bright-green, thin, oblong-ovate to elliptic-lanceolate, acute to slightly mucronate, 4–6 mm. long, 1.5–2.5 mm. broad, on the lower surface subappressed- to spreading-pilose along the midrib and prominently spreading-pilose to villous on the margin, glabrous above: fruiting stems several, 25–40 cm. high and loosely to compactly paniculate-branched, or one 10–15 cm. high, globular-paniculate and very leafy-branched; the axis sparingly and minutely pilose: primary branches spreading to ascending, diminishing upward; secondary branches scattered, slender: cauline leaves acute to slightly mucronate, at first narrowly elliptic-lanceolate, becoming narrowly oblanceolate; rameal leaves acute and narrowly lanceolate to linear, acute, sparsely subappressed-pilose beneath on midrib and margin: fruits scattered-racemose on the secondary branches: pedicels filiform, sparsely and finely subappressed-pilose to glabrous, 1.5–3.5 mm. long, usually slightly exceeding the calyx: calyx narrowly pyriform, sparingly to strongly subappressed-pilose, 1.8–2 mm. long, slightly more than half as broad; interior sepals narrowly elliptic to spatulate, subacute to obtuse; exterior sepals narrowly lanceolate or linear, considerably shorter than the inner: capsule equaling to slightly exceeding the calyx, slenderly ellipsoid to slenderly ovoid, 1.7–1.9 mm. long, 1–1.2 mm. broad, often distinctly inequilateral: seeds 1–3, mostly 2, 1–1.3 mm. long, about half as broad, dark-brown, the embryo not visible through the endosperm, oblong-ovoid, nearly equilateral, dorsiventrally compressed, the dorsal surface slightly rounded-convex, the ventral surface flattened.—Fl. Bor.-Am. i. 77 (1803); Pursh, Fl. Am. Sept. i. 91 (1814); Elliott,



LECHEA MENSALIS: FIG. 1, TYPE, × ⅖; FIG. 2, fruits, × 8; FIG. 3, capsules, × 8; FIG. 4, seeds, × 10.

L. TENUIFOLIA: FIG. 5, fruits and separated capsule, × 8; FIGS. 6 and 7, seeds, × 10.

L. TENUIFOLIA, var. OCCIDENTALIS: FIG. 8, fruits and capsule, × 8; FIG. 9, seeds, × 10.

L. DECKERTII: FIG. 10, fruits, × 8, from TYPE.

L. TRIPETALA: FIG. 11, seeds, × 10.

Sk. Bot. S. Car. & Ga. i. 184 (1816), in part; Smith in Rees, Cycl. xx. (1819); Torrey, Fl. N. & Mid. St. 161 (1824); Dunal in DC. Prodr. i. 285 (1824); Torrey, Comp. Fl. N. & Mid. St. 74 (1826), in part; Leggett in Bull. Torr. Bot. Cl. vi. 251 (1878); Chapman, Fl. So. U. S. ed. 2. Suppl. 678 (1892); Britton in Bull. Torr. Bot. Cl. xxi. 248 (1894); Robinson in Gray, Syn. Fl. N. Am. i[1]. 195 (1895); Britton in Britton & Brown, Ill. Fl. ii. 442, fig. 2476 (1897); Chapman, Fl. So. U. S. ed. 3: 37 (1897); Britton, Man. 632 (1901); Grosser in Engler, Pflanzenr. iv[193]. 135, fig. 22, A–M (1903); Small, Fl. 798 (1903); Robinson & Fernald in Gray, Man. ed. 7: 579 (1908); Stone, Pl. So. N. J. 562, pl. 83, fig. 2 (1911); Small, Man. 883 (1933). *L. minor* α. Torrey & Gray, Fl. N. Am. i. 153 (1838). *L. minor* var. *gracilis* Torrey, Fl. N. Y. i. 79 (1843). *L. minor* of many early American authors, in small part; not L.—Sandy fields and barrens of the Coastal Plain and slopes and summits of the southern Appalachian Mountains, tolerant of limestone, Georgia to Missouri, north to southeastern New York, Pennsylvania, West Virginia and Indiana. The characters of *L. racemulosa* are sufficiently distinct to make unnecessary the citation here of representative specimens. MAP 13.

The name *Lechea racemulosa* has been attributed variously to Michaux and to Lamarck. The Michaux description is quite satisfactory for the species. Furthermore, there is a type-specimen in the Michaux Herbarium which is mentioned by Britton.[1] Lamarck has been given the credit for the name on the basis of the date 1793 on the title page of Tome ii. "Tableau Encyclopédique et Méthodique." According to a note of C. Davies Sherborn and B. B. Woodward,[2] Tome ii.[2] 137–551, with title-page dated 1793, was published in 1819, their source of information being Bibl. Franc. Nov. 6, 1819: 513 (1819). The description of *L. racemulosa* was on page 423 in this volume. Here there is reference to an illustration[3] which was published in 1797, a figure of a *Lechea*, placed wrongly with *Gaura*. Lamarck stated that the illustration applied to *L. racemulosa*, at the same time referring back to "Dict. Suppl. no. 2" (*i. e.* the second species under *Lechea*),[4] where the name is ascribed to Michaux. I should have to take his word, however, for the identity of the subject of the illustration, since no specific characters are delineated. It is the same, or worse, with all of Lamarck's illustrations of *Lechea*.

The distribution of *Lechea racemulosa* shows it to be a settled and presumably very old species. It is decidedly abundant on the sum-

[1] Bull. Torr. Bot. Cl. xxi. 248 (1894).

[2] Annals and Magazine of Natural History, June (1906); partially repr. in Journ. Bot. xliv. 318–320 (1906).

[3] Lam. Rec. de Planch. Bot. de l'Encycl. ii. pl. 58 (1797).

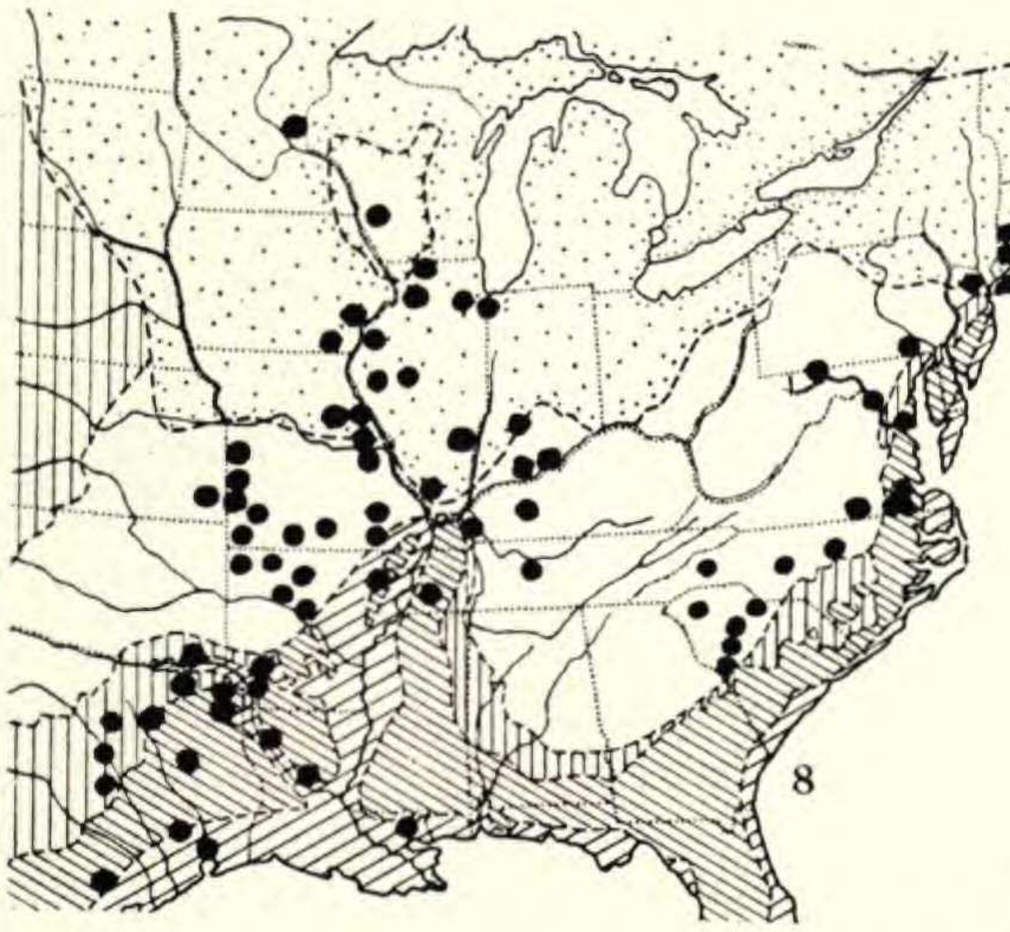
[4] Encycl. Method. Suppl. iii. 340 (1813).

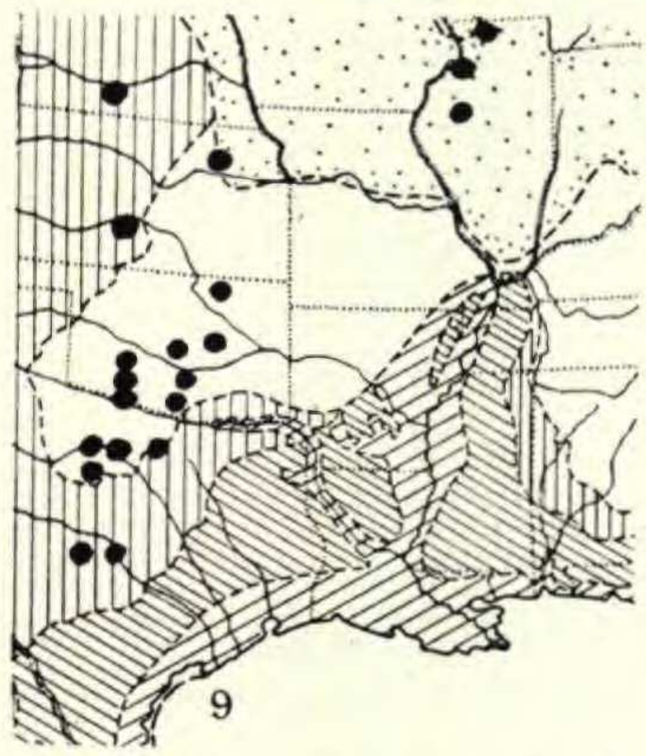
mits and slopes of the high Appalachians and almost equally prominent on the Coastal Plain. That its present range is not of recent origin is shown by its presence only in or very close to areas generally considered to have escaped continental glaciation during the Pleistocene. The one exception to this is the station at the southern end of Lake Michigan in Indiana. The fact that several other species of *Lechea*, otherwise rare in or absent from supposedly glaciated areas, are found here and at times also along the shore of Lake Erie, points to the obvious conclusion that the distribution around the Great Lakes was attained at some time long previous to the present, during some phase of the Wisconsin ice-advance or even before the Wisconsin.

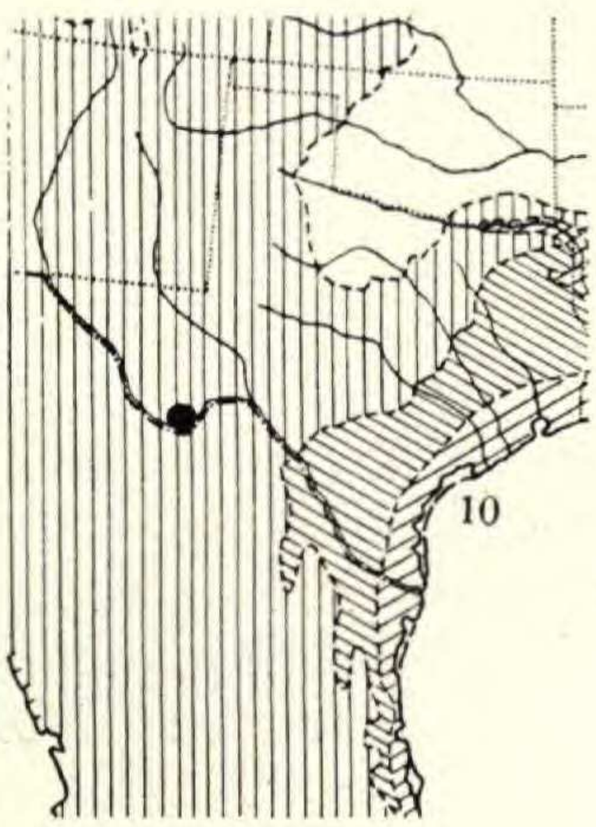
The characters of *Lechea racemulosa* are very constant, as much so, in fact, as those of *L. minor*. On the Coastal Plain, on the Appalachian summits and on the dunes of Lake Michigan there are no perplexing forms or trivial variations, of which we find an abundance in most of our northern species.

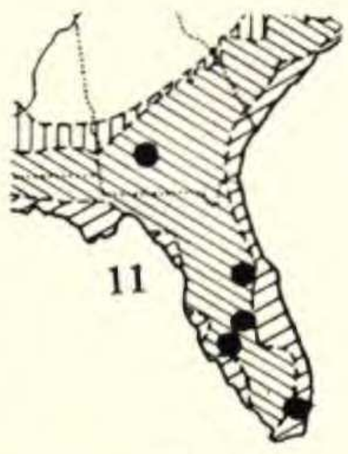
Although both distribution and constancy of characters indicate a considerable antiquity for the species, the characters in most cases seem to be derived ones, the reduction of seeds per capsule to one or two for example. It is apparent throughout the genus, in fact, that those species which are obviously derived from a primitive type, either by great reduction or by coalescence of parts or by prominent modification of parts, are found in definitely ancient floristic areas. The unmodified primitive characters, on the other hand, are, generally speaking, possessed by several wide-ranging species, rejuvenated in glaciated America.

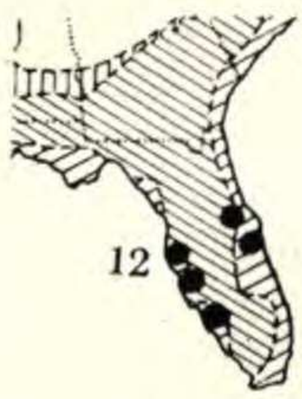
11. L. CERNUA Small. Plant with an extensive branching caudex or commonly suffruticose and with most of the principal branches persisting: basal shoots lacking; the shoots borne frequently far below the middle, reaching nearly full size and extensively branching (but not fruiting) the first season, in maturity spreading-ascending, 20 or more cm. long, their axes and those of the branches densely and somewhat divergently pilose: leaves decidedly heteromorphic, crowded; the earliest small, about 0.5 cm. long, not more than half as broad, densely spreading-pilose on both surfaces; the later comparatively large, thick, 0.5–1.2 cm. long, often nearly as broad, elliptic-ovate to orbicular, acute- to mucronate-tipped, densely subappressed- to spreading-pilose or subtomentose on both surfaces; those of the mature branches narrowly elliptic-ovate, narrowing gradually to the acute or pointed tip, less than 1 cm. long, densely pilose to subtomentose below, pilose above with more scattered hairs: fruits sparse, in open fascicles of a few each at the tips of and along the short fruiting

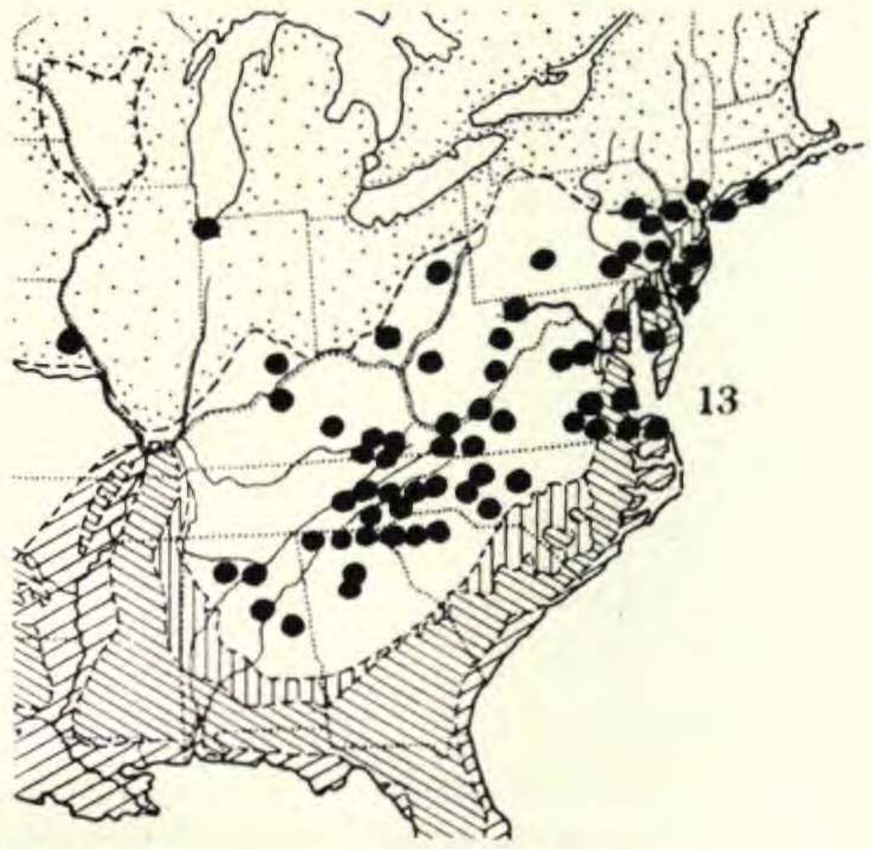


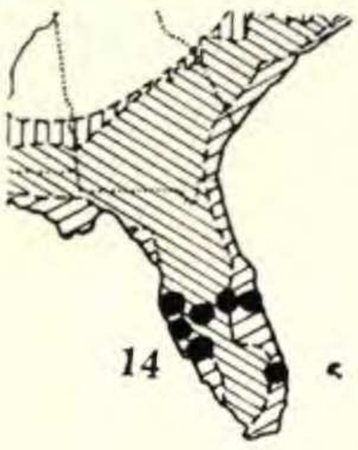


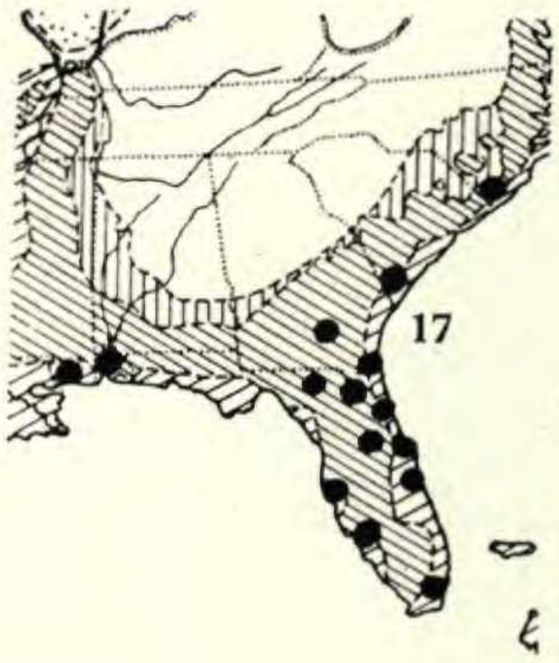


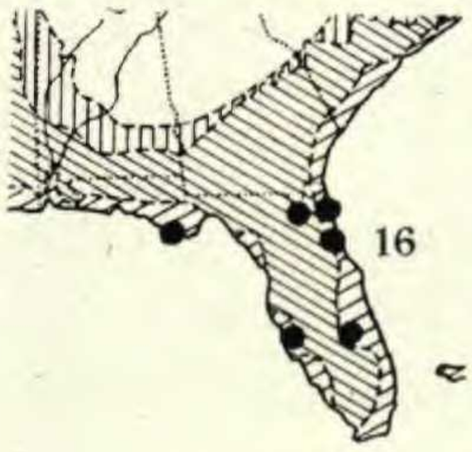


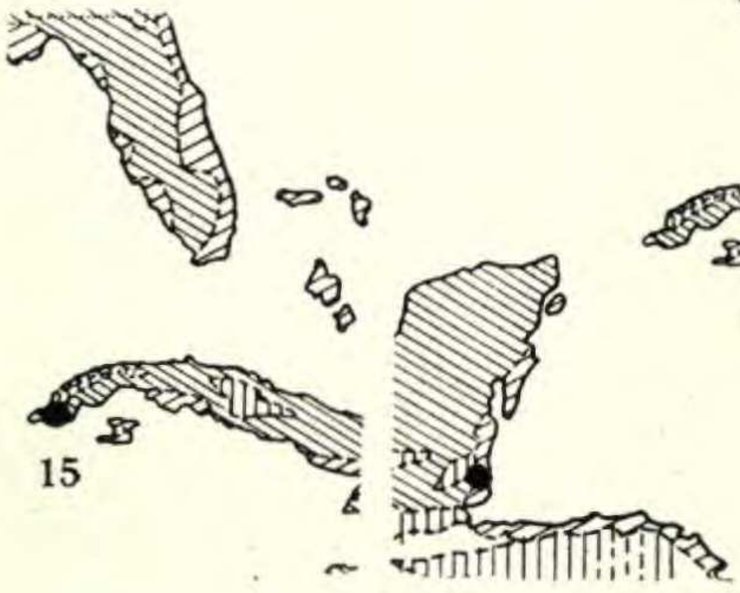












MAP 8, range of LECHEA TENUIFOLIA; 9, of L. TENUIFOLIA, var. OCCIDENTALIS; 10, of L. MENSALIS; 11, of L. DECKERTII; 12, of L. DIVARICATA; 13, of L. RACEMULOSA; 14, of L. CERNUA; 15, of L. CUBENSIS; 16, of L. TORREYI; 17, of L. TORREYI, var. CONGESTA; 18, of L. MARITIMA, var. TYPICA; 19, of L. MARITIMA, var. VIRGINICA; 20, of L. MARITIMA, var. SUBCYLINDRICA.

branches, erect or pendent, standing frequently at right angles to the axis, or as frequently reflexed to horizontally spreading: pedicels 1.5–2.5 mm. long, closely and minutely pilose: calyx about 2 mm. long, strongly pyriform, gradually broadening upward; the outer and inner sepals joined in an obconic base; the inner spatulate to elliptic-obovate and obtuse, densely and closely subappressed-pilose; the outer narrowly lanceolate, inconspicuous, much exceeded by the inner ones and joined with them high on the calyx: capsule dull, ellipsoid-ob-ovoid, about 2 mm. long, equaling to slightly exceeding the calyx; the valves blunt, somewhat indurated, considerably coalesced, in maturity separating about to the middle: seeds 1–2, dark-brown, large (1.2 mm. or more long, 0.7–0.9 mm. broad), nearly equilateral to quite irregular, mostly with a considerably enlarged basal portion, the dorsal surface strongly convex and the ventral surface concave, with a membranaceous coat in maturity.—Bull. Torr. Bot. Cl. li. 384 (1924); Small, Man. 883 (1933).— Southern peninsular Florida, on sand-hills, sand-dunes and in scrub. I have seen the following specimens. FLORIDA: scrub, near Sebastian, *Small, DeWinkeler & Mosier*, no. 11,164 (NY); scrub, on sand-hills, near Sebastian, *Small, Small & DeWinkeler*, no. 11,542 (NY); ancient sand-dunes, near Sebastian, September 6, 1922, *Small, Small & DeWinkeler* (TYPE in Herb. N. Y. Bot. Gard.); scrub, near Sebastian, *Small & DeWinkeler*, no. 9832 (NY); sand-hills about Lake Jackson, *Small, Small & DeWinkeler*, no. 10,636 (NY); in a scrub, 13 miles south of Clearwater, August 21, 1929, *H. O'Neill* (US); scrub, between Avon Park and Sebring, *Small, Small & DeWinkeler*, no. 11,494 (NY); scrub, near Kuhlman, DeSoto Co., December 13, 1920, *Small & DeWinkeler* (NY); scrub-ridge, south of Frost Proof, DeSoto Co., *Small & DeWinkeler*, no. 9591 (NY); Manatee Co., *Chapman* (Mo); scrub, near Sarasota, *Small & Matthaus*, no. 11,630 (NY); Palm Beach, July, 1932, *W. Rhoades*, no. 2 (US). PLATE 490, FIGS. 2, 3, and 4; MAP 14.

This, one of the most striking species of *Lechea*, had been quite overlooked until Small, recognizing some of its distinctive features, described it in 1924. Of its position in the genus he[1] then stated, "Technically it is related to *L. racemulosa*." Later, however, he[2] provided a special section, "*Cernuae*," to include it. With its broad leaves densely hairy both on the upper and on the lower surface, its shrubby habit and its peculiarly disposed fruits, having indurated capsules with valves considerably grown together, *L. cernua* is very greatly specialized. Only in the number of seeds per capsule (1 to 2) and in the great length of pedicels is it similar to *L. racemulosa;* and several other species share these characters. Without caring to make a major division for this or any other species except *L. san-sabeana*, I would,

[1] Bull. Torr. Bot. Cl. li. 384 (1924).
[2] Man. 883 (1933).

nevertheless, say that *L. cernua* is so distinct as to make obscure its relative position in the genus. In this respect it compares with *L. divaricata* and *L. san-sabeana*, both of which have modifications which, in a much less specialized condition, may be seen in but two or three other, and perhaps related, species.

12. L. CUBENSIS Leggett. Plant suffruticose, basal shoots unknown (probably lacking): fruiting stems several, low, 12–18 cm. tall, with sparsely pilose, spreading, slender branches disposed in irregular panicles and, to a considerable extent, persistent: cauline leaves narrowly linear to subulate, 3–5 mm. long, glabrous above, subappressed- to appressed-pilose beneath, caducous, thickly cloaking the branches before maturity: pedicels sparsely subappressed-pilose, 1.5–1.8 mm. long: fruiting calyx cuneate-obovoid, 1.8–2 mm. long, 1.2–1.4 mm. broad; interior sepals closely subappressed-pilose, obovate, obtuse, about 1 mm. broad, slightly exceeding the outer sepals: capsules about equaling the calyx; valves elliptic-oblong, 1.7–1.9 mm. long, 1–1.1 mm. broad: seeds 4–5, dark-brown, with dense endosperm, slightly curved, slender, slightly enlarged at the base, at least twice as long as broad, strongly convex dorsally, keeled ventrally and with one flat or concave side, the other convex or rounded.—Bull. Torr. Bot. Cl. vi. 252 (1878); Britton in Bull. Torr. Bot. Cl. xxi. 250 (1894); Grosser in Engler, Pflanzenr. iv[193]. 137 (1903).—Western Cuba, apparently very local. CUBA: sandy pine woods, La Grifa, January, 1865, *C. Wright*, no. 3518 (TYPE in Herb. N. Y. Bot. Gard.); Laguna Larga, near La Grifa, Pinar del Rio, *Ekman*, no. 18,164 (NY). PLATE 490, FIG. 5; MAP 15.

I have seen but two collections of this species both of which are somewhat fragmentary. Apparently the plant is characteristically very low and much branched. The calyces, capsules and seeds are most like those of *Lechea Torreyi* of the Florida Peninsula, the habit most like that of *L. Torreyi* var. *congesta* of broader distribution. Britton[1] says, after his description of *L. cubensis*, "this interesting species, known to me only from one collection, is placed next to *L. tenuifolia*, but the material for examination is too meagre to afford a satisfactory diagnosis." The most striking resemblance of the two is in the exterior sepals. In both these are long. In other respects, as of the fruit mentioned above, *L. cubensis* is much closer to *L. Torreyi*. The indication seems to be that most Lecheas at first had long exterior sepals and later these became reduced in many species. In the retention of fairly long exterior sepals *L. cubensis* is a primitive species of the *L. Torreyi* group. *L. tenuifolia* and its relatives have globose to

[1] Bull. Torr. Bot. Cl. xxi. 250 (1894).

broadly ovoid calyces broadest near the base. *L. cubensis*, on the contrary, has a cuneate-obovoid calyx serving to place it in quite another group of the genus, with *L. Torreyi* and its allied species.

13. L. Torreyi Leggett. Caudex mostly simple, the new shoots appearing from near the base of the plant, or extensively branched, with the new shoots from above: basal shoots in late fall or winter, resting or immediately developing, suberect, slender, simple to slightly branched, 6–10 or more cm. tall; the axis slightly spreading-pilose with short hairs: leaves dull, brownish-green, alternate, scattered, linear, acute, pilose beneath on midrib and margin, occasionally sparingly so elsewhere, glabrous above, 5–8 mm. long, 1 mm. wide or less: fruiting stems 1–several, 30–50 cm. high, branching mostly above the middle to form open or compact ovoid to subglobose panicles; the axis strongly pilose: cauline leaves dull, brownish-green, narrowly linear-elliptic, pointed, conspicuously pilose beneath mainly on midrib and margin, glabrous above, 1–2 cm. long, 1–1.5 mm. wide; rameal leaves similar but smaller, crowded, spreading: branches open and spreading-ascending to somewhat crowded and strongly ascending: ultimate fruiting branches strongly pilose, mostly straight; fruits racemose, scattered to subapproximate, maturing in early autumn: pedicels (0.5) 0.8–1.5 mm. long, densely pilose: fruiting calyx subglobose to obovoid, broadest above the middle, dark-brown to slightly ferruginous, densely pilose with short, soft, appressed to somewhat spreading cinereous hairs, about 2 mm. long, 1.6–1.8 mm. broad, exceeding and nearly or quite enclosing the capsule; inner sepals obovate-elliptic, obtuse; outer sepals about two-thirds as long as the inner: capsule ovoid, 1.5–1.7 mm. long, 1.4–1.5 mm. broad; valves firm, not greatly indurated: seeds 4–6, subequilateral and dorsiventrally compressed to inequilaterally 3-sided with one convex and one concave lateral face, 0.9–1 mm. long, less than half as broad.—Leggett ex Britton in Bull. Torr. Bot. Cl. xxi. 251 (1894), in part; Robinson in Gray, Syn. Fl. N. Am. i^{1}. 194 (1895), in part; Grosser in Engler, Pflanzenr. iv^{193}. 138 (1903), in part; Small, Fl. Se. U. S. 799 (1903), in part; Small, Man. 883 (1933), in part. *L. cinerea* sensu Leggett in Bull. Torr. Bot. Cl. vi. 247 (1878), in part; not Rafinesque. *L. cinerea* var. *Torreyi* Chapman, Fl. So. U. S. ed. 2, Suppl. 678 (1892) and ed. 3: 37 (1897).—Damp barrens and dry sandy ground, Florida, on the Atlantic and Gulf Coasts and inland. The following specimens are typical. Florida: Jacksonville, December 10, 1873, *Keeler*, in part (NY); rather moist ground, Mayport, October, 1873, *Keeler* (NY); St. Augustine or thereabouts, March, 1872, *J. Torrey* (type in Herb. N. Y. Bot. Gard.); road to Huckleberry Creek, Apalachicola, September 28, 1889, *Chapman* (Mo); camp, pine-barrens, just south of Poorhouse Landing, Apalachicola, September 20, 1889, *Chapman* (Mo); Okeechobee Prairie, Fort Bassinger to Okeechobee City, December 13, 1920, *Small & DeWinkeler* (NY); *Biltmore Herb.*, no. 4131; Mana-

tee, *Simpson, Chapman,* no. 414 (Mo); Braidentown, *Tracy,* no. 7579 (Field). PLATE 490, FIG. 6; MAP 16.

Var. **congesta,** nom. nov. Caudex simple or branching: fruiting stems often perennial, 20–40 cm. high: basal resting shoots lacking; new shoots from base of plant or from above on the perennial stems, developing without rest: plant dull-brownish-green, more densely pilose than the typical form of the species: panicles very compact, the branches crowded, strongly ascending to suberect: fruits very abundant, crowded, irregularly racemose to clustered on crooked short branches which are often sharply bent at each pedicel: calyx-lobes in maturity strongly ferruginous, giving a reddish cast to the plant in fruit; outer sepals scarcely two-thirds as long as the inner: seeds 3, equilateral, dorsiventrally compressed, elliptic-oblong, acute.—*L. cinerea* sensu Leggett in Bull. Torr. Bot. Cl. vi. 278 (1878), in part; Chapman, Fl. So. U. S. ed. 2, Suppl. 678 (1892) and ed. 3: 37 (1897); not Raf. *L. Torreyi* Leggett ex Britton in Bull. Torr. Bot. Cl. xxi. 251 (1894), in part; Robinson in Gray, Syn. Fl. N. Am. i^{1}. 194 (1895); Grosser in Engler, Pflanzenr. iv^{193}. 138 (1903); Small, Fl. Se. U. S. 799 (1903); Small, Man. 883 (1933).—Dry sandy areas and pine-barrens, southern North Carolina, west to southern Mississippi, south to southern Florida and British Honduras. The following are typical. NORTH CAROLINA: dry sand, west of Southport, January 30, 1922, *E. B. Bartram* (Phila). SOUTH CAROLINA: Bluffton, October 21, 1876, *Mellichamp;* Bluffton, September, 1875, *Mellichamp* (NY); Beaufort District, 1882, *Mellichamp* (US). GEORGIA: base of sand-hills of Seventeen Mile Creek, Coffee Co., R. M. Harper, no. 1436. FLORIDA: dry pine-barrens near Jacksonville, *Curtiss,* no. 5025; Jacksonville, December, 1873, *Keeler,* in part (NY); near Jacksonville, *Curtiss,* no. 4308 (Mo); dry pine-barrens, Duval Co., *Curtiss,* no. 232* (TYPE in Herb. N. Y. Bot. Gard.); Lake City, June–July, 1898, *A. S. Hitchcock* (Field); St. Augustine, May 1, 1879, *M. C. Reynolds;* St. Augustine, 1874, *Keeler;* New River, December 26, 1895, *A. S. Hitchcock* (Field); Sanford, September, 1902, *S. Rapp,* no. 3 (US); Eustis, Lake Co., *Nash,* no. 1096; Indian River, East Florida, 1874, *E. Palmer;* Manatee, *Simpson* (Mo); Tampa, August 25, 1903, *Britton & Wilson* (NY); Flatwoods, Myers, July and August, 1900, *A. S. Hitchcock,* no. 4; vicinity of Fort Myers, Lee Co., *J. P. Standley,* no. 318; Humbugus Prairie, Dade Co., *Small, Mosier & Small,* no. 6873 (NY). ALABAMA: sandy copses, near Dog River, Mobile Co., July 14, 1893, *Mohr* (US). MISSISSIPPI: Horn Island, July 14, 1899, *Tracy* (NY). BRITISH HONDURAS: dry pine-ridge, near Manatee Lagoon, *M. E. Peck,* no. 143. PLATE 490, FIG. 7; MAP 17.

There are several marked differences between *Lechea Torreyi* and the variety *congesta* which enable one immediately to set them apart. Whereas they both are strongly pilose almost all over and both are brownish-green, the former is loosely spreading-branched, with some-

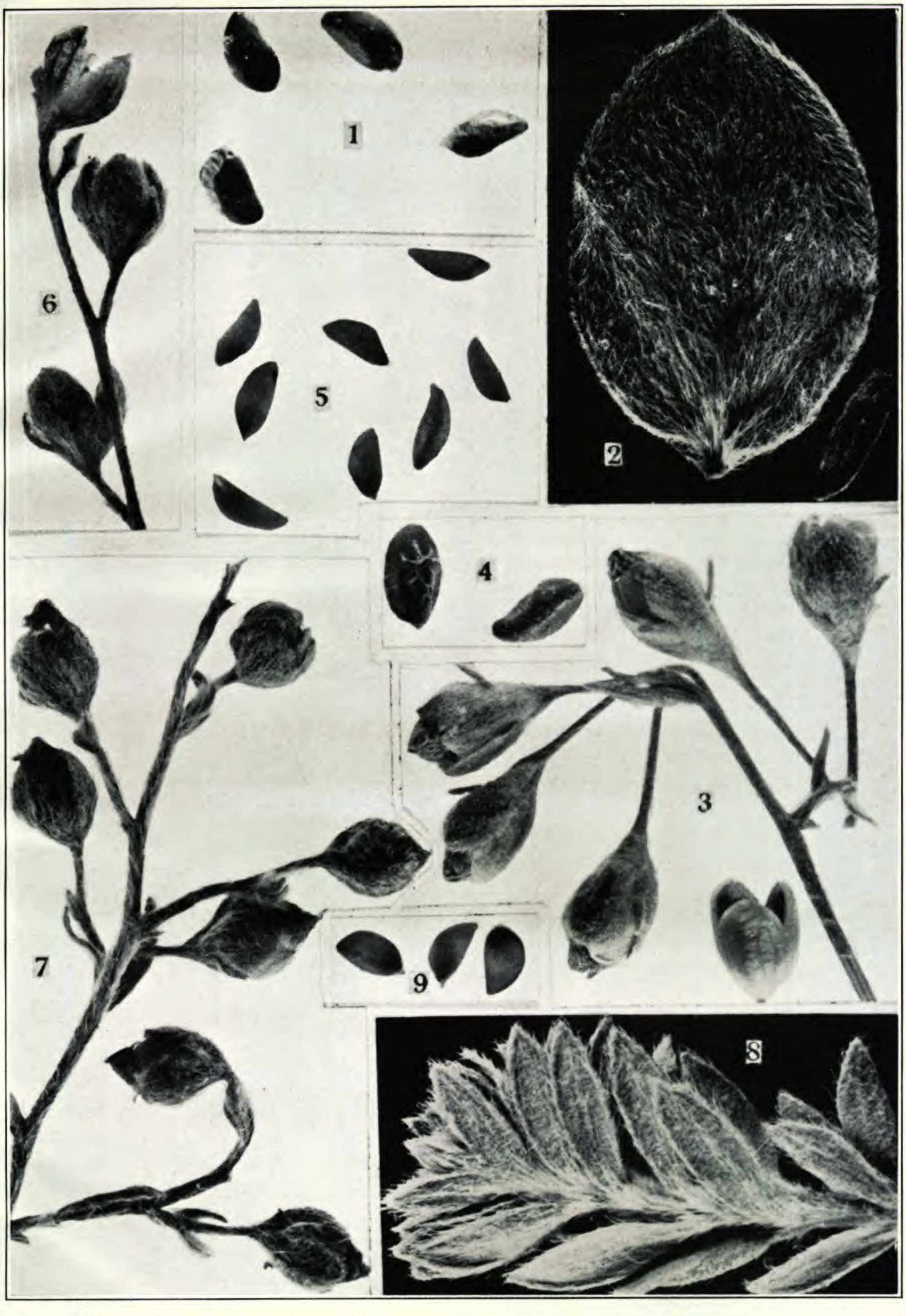
what scattered fruits, the latter compactly ascending-branched, with crowded, even clustered, fruits. The inner sepals of *L. Torreyi* are dark-brown, occasionally ferruginous, but strikingly setting off the ashy (cinereous) pilosity which, apparently, chiefly caused Chapman to use the name "*cinerea*" of Rafinesque. *L. Torreyi* var. *congesta* has its inner sepals in maturity usually markedly ferruginous, so strikingly so, in fact, as to make obscure any peculiarity in color of their pubescence. A further difference lies in the number of seeds, which is 4–6 in *L. Torreyi* and 3 in var. *congesta*.

Britton[1] states that the types are in the Columbia College Herbarium, now embodied in the collections of the New York Botanical Garden. Presumably these are the several sheets there marked *L. Torreyi*, nov. spec. These are of both *L. Torreyi* and the variety *congesta*. In recognition of the fact that the species was named for Dr. Torrey, I have selected a specimen of his collecting as the type, "St. Augustine or thereabouts, March, 1872, Dr. John Torrey" (in Herb. New York Bot. Gard.).

Leggett,[2] in discussing Rafinesque's monograph of the genus, says of the diagnosis of *L. cinerea* Raf. "This is a pretty correct description of what I have distributed to correspondents as *L. Torreyi*. However there may be two distinct forms in Florida, one 3 seeded, the other 6 seeded and the name *L. Torreyi* I have hopes may hold." Chapman[3] also used the name *cinerea*, applying it to the 3-seeded plants. In addition he described, for the first time, what he called var. *Torreyi:* "Leaves and branches spreading or recurved; capsule 6-seeded (L. Torreyi, Leggett, ined.—S. Florida)." Britton eliminated the name *cinerea* in connection with *L. Torreyi*. His *L. Torreyi*, however, included Chapman's species and variety. Inasmuch as Britton's description fails to differentiate adequately between the two and as *L. Torreyi* is not properly typified by him, it falls on me to select a type for it. This I have done, allowing Chapman's var. *Torreyi* to include the type of *L. Torreyi* Leggett ex Britton.

Lechea cinerea Rafinesque[4] is placed by that author with the group "*Menandra*," having seeds 1–3 and external calyx of 2 short sepals. It is described as "adpressed pubescent, cinereous fastigiate; lvs. scattered, narrow linear adpressed; racemes paniculate, pauciflore,

[1] Bull. Torr. Bot. Cl. xxi. 251 (1894).
[2] Bull. Torr. Bot. Cl. vi. 250 (1878).
[3] Fl. So. U. S. ed. 2, Suppl. 678 (1892).
[4] New Fl. N. Am. i. 95 or 96 (1836).



LECHEA DIVARICATA: FIG. 1, seeds, × 10.

L. CERNUA: FIG. 2, upper surface of basal leaf (large) and a rameal leaf, × 4, from TYPE; FIG. 3, fruits, × 8; FIG. 4, seeds, × 10.

L. CUBENSIS: FIG. 5, seeds, × 10.

L. TORREYI: FIG. 6, fruits, × 8, from TYPE.

L. TORREYI, var. CONGESTA: FIG. 7, fruits, × 8.

L. MARITIMA, var. TYPICA: FIG. 8, basal shoot, × 4.

L. MARITIMA, var. VIRGINICA: FIG. 9, seeds, × 10, from TYPE.

subnaked: fls. canescent outside, sepals lanceolate acute; capsules oblong, longer." Except for the "lanceolate acute" sepals and the "oblong, longer" capsules the description might fit *L. Torreyi*. These, however, are characters of *L. patula*. It may be that, as is apparently the case with so many of Rafinesque's descriptions, he was dealing here with more than one species. In any case confusion would always arise if the name were here applied. Certainly capsules subglobose, enclosed by the calyx, as is the case in *L. Torreyi*, can never be interpreted to read "capsules oblong, longer" than the calyx.

A. A. Heller[1] mentions two specimens, one from Virginia, "at Suffolk in company with *L. racemulosa*," and the other along the North Carolina boundary, "on the southern boundary of Virginia, near Margarettsville, N. C." Both of these specimens are presumably of the *L. Leggettii* group which may resemble in habit, at least, large and openly branched specimens of *L. Torreyi*. Under *L. Leggettii* var. *ramosissima* I have cited a specimen of Heller's, "near Margarettsville, Northampton Co., no. 1128," possibly the identical plant of which he speaks. *L. Torreyi*, to the best of my knowledge, fails to get farther north than southern North Carolina.

14. L. MARITIMA Leggett. Caudex simple to multicipital, with stout often nearly erect branches: basal shoots simple, numerous and crowded to few and scattered, 3–10 cm. long; axes stout, densely pilose to subtomentose: basal leaves thick, dull-green, numerous, crowded (overlapping), often obscurely verticillate, lanceolate to elliptic-lanceolate, 3–5 times as long as broad, glabrous above, sparsely to densely pilose over the entire lower surface: fruiting stems stout, few to numerous, erect to strongly inclined: panicle evenly subpyramidal to narrowly subcylindric or decidedly one-sided, 15–35 cm. high; branches starting from near the base to above the middle: cauline leaves whorled and caducous below the panicle, alternate, approximate and mostly persistent in the panicle, narrowly oblanceolate, abruptly acute, narrowed gradually to the base, 0.7–2.5 cm. long, 1.2–4 mm. broad, during development subglabrous to conspicuously scattered-pilose on the upper, scattered-pilose on the lower surface; in maturity mostly glabrous on the upper surface and scattered-pilose on the lower: rameal leaves shorter and proportionately narrower, often crowded: fruits mostly subappressed, on secondary or tertiary branches, crowded and clustered at the tips to distinctly racemose and not crowded: flowers in late summer: stamens variable in number (6–10 or more): pedicels 1 mm. or less to 2 mm. long: calyx pyriform to broadly ovoid, 1.6–2.1 mm. long, strongly subappressed-pilose: inner sepals slightly keeled, elliptic-ovate and subacute to elliptic and

[1] Bull. Torr. Bot. Cl. xxi. 23 (1894).

acute; outer sepals much shorter than to equaling the inner: capsule 1.3–2.1 mm. long, subglobose to broadly ovoid, shorter than to equaling the calyx: seeds 2–5 (–6), light-brown, not lustrous, the surface smooth, with the embryo faintly discernible through the semitransparent endosperm, slightly inequilateral; in shape and in number per capsule variable in the species as a whole, but with fairly constant characters in each of the varieties.

a. Panicles subcylindric to broadly subpyramidal, the branches mostly from below the middle: calyx mostly pyriform to cuneate-obovoid, 2 mm. or less in length; the outer sepals inconspicuous, considerably exceeded by the inner: seeds 2–4 (–5).

Seeds 3–4 (–5), obscurely 3-sided or 2-sided and convex ventrally, 0.8–1.1 mm. (mostly 1 mm. or slightly less) in length, much less in width: panicle branching at about the middle, mostly uniformly so.....Var. *typica.*

Seeds 2, dorsally convex, ventrally flattened to slightly concave, 1–1.2 mm. (mostly more than 1 mm.) long, 0.7–0.8 mm. broad: panicle branching mostly from near the base, often 1-sided and to a considerable extent persistent to the second year.....Var. *virginica.*

a. Panicle slenderly subcylindric, the branches mostly from above the middle: calyx slightly depressed-globose, 2 mm. or slightly more in length; the outer sepals conspicuous, at times nearly equaling the inner: seeds 4–5 (–6).

Var. *subcylindrica.*

Var. **typica.** Caudex simple, unbranched and but slightly enlarged (particularly inland), or greatly thickened and multicipital (when partially or completely buried in sand), with stout, woody subprocumbent to nearly erect branches (along the Atlantic Coast in sandy areas): basal shoots procumbent to suberect, 3–10 cm. long; their leaves obscurely whorled, overlapping and crowded toward the end of the shoot, 5–10 mm. long, from one-third to one-quarter as broad, largest toward the tip of the shoot (at its base very small early leaves frequently persisting), lanceolate and acute, rounded at the base, uniformly sparsely to densely subappressed-pilose over the entire lower surface, glabrous above: fruiting stems 15–35 cm. high, branching from below the middle, forming either a dense pyramidal panicle with the lower branches long and broadly spreading and with the uppermost branches very short or a subcylindric open panicle with the lower branches not greatly exceeding the upper: cauline leaves somewhat scattered-pilose above in development: fruits of the dense panicles mostly in clusters on short secondary branches, of the open cylindrical panicles scattered along the secondary and the upper primary branches: pedicels 1 mm. or less to 1.5 mm. long: calyx pyriform to subglobose, 1.8–2 mm. long, strongly pilose; interior sepals elliptic to elliptic-ovate, acute, slightly keeled; exterior sepals narrowly lance-linear, much shorter: capsule broadly ovoid to globose, 1.3–1.8 mm. long, nearly as broad, hardly equaling the calyx; valves ovate, spreading slightly at maturity: seeds mostly 3 (rarely 2 or 5),

0.8–1.1 mm. long, 2-sided and dorsally rounded, ventrally convex or 3-sided and with 2 quite unequal and somewhat obscure lateral faces, the base enlarged, the apex subacute.—*L. maritima* Leggett in Britton, Prel. Cat. Pl. N. J. 13 (1881); Britton in Bull. Torr. Bot. Cl. xxi. 249 (1894); Robinson in Gray, Syn. Fl. N. Am. i[1]. 192 (1895); Britton in Britton & Brown, Ill. Fl. ii. 443, fig. 2478 (1897); Britton, Man. 632 (1901); Grosser in Engler, Pflanzenr. iv[193]. 138 (1903); Small, Fl. 799 (1903); Robinson & Fernald in Gray, Man. ed. 7: 578 (1908); Stone, Pl. So. N. J. ii. 563, pl. 83, fig. 4 (1911); N. Taylor, Fl. Vic. N. Y. 449 (1915); Small, Man. 883 (1933). *L. thymifolia* sensu Pursh, Fl. Am. Sept. i. 91 (1814); Torrey, Fl. N. & Mid. St. 161 (1824); Eaton, Man. ed. 3: 328 (1822); Eaton & Wright, N. Am. Bot. 294 (1830); Beck, Bot. No. U. S. ed. 1: 36 (1833); Torrey & Gray, Fl. N. Am. i. 153 (1838); Wood, Class Bk. Bot. 57 (1845); Torrey, Fl. N. Y. i. 79 (1843); Gray, Gen. Ill. i. 206, t. 88 (1848) and Man. ed. 5: 81 (1867); Leggett in Bull. Torr. Bot. Cl. vi. 251 (1878); not Michx. *L. minor* var. *maritima* Gray in Watson & Coulter in Gray, Man. ed. 6: 77 (1890). *L. maritima* var. *interior* Robinson in RHODORA, x. 34 (1908). —Sandy soil near the sea, and inland, particularly in river valleys, southern Maine and north-central New Hampshire (Crawford Notch) to Delaware, in Massachusetts and southern New Hampshire abundant, generally, on dry slopes. The varieties of *L. maritima* are geographically segregated and have well defined characters making it unnecessary to record representative material of var. *typica*. PLATE 490, FIG. 8; MAP 18.

Var. **virginica,** var. nov. Caudex crassus multicipitalis ramis saepe ad 1 dm. longis subprocumbentibus apice adscendentibus; rami basilares pauci sparse dispositi; folia basilaria saepe persistentia 4–5- plo longiora quam lata; caules fructiferi erecti vel suberecti; panicula subaequilateralis vel caule declinato inaequilateralis ramis suberectis; rami sub medio plerumque longissimi (ad 30 cm. longis) supra medium gradatim breviores; calyx late ellipsoideus vel subglobosus 1.9–2.1 mm. longus; capsula late ellipsoidea vel depressoglobosa 1.5–1.9 mm. longa 1.5–1.7 mm. lata; semina plerumque 2 dorso convexa ventre plana vel concava subaequilateralia 1–1.2 mm. longa 0.7–0.8 mm. lata.—Sandy areas near the coast in southeastern Virginia. I have seen the following specimens. VIRGINIA: sand dunes, Savage Neck, Northampton Co., *Fernald & Long*, no. 5377; Fortress Monroe, May 12, 1877, *L. F. Ward* (US); outer dunes, vicinity of Cape Henry, *E. P. Killip*, no. 6660 (NY); sand dunes, Cape Henry, *Fernald & Griscom*, no. 2856; open sands and dunes, Cape Henry, *Fernald & Long*, no. 4948; Virginia Beach, September 26 & 27, 1890, *Hollick & Britton* (TYPE in Herb. N. Y. Bot. Gard.); near Virginia Beach, *T. H. Kearney, Jr.*, nos. 1387, 2094 (US); near Ocean View, Norfolk Co., *T. H. Kearney, Jr.*, no. 1001 (US). PLATE 490, FIG. 9; MAP 19.

Var. **subcylindrica,** var. nov. Caudex simplex vel multicipitalis ramis paucis brevibus; rami basilares eis varietatis typicae similis,

folia basilaria dorso plus minusve pilosa; folia caulina supra plerumque glabra dorso subadpresse pilosa praecipue in costa et in margine; caules fructiferi pauci erecti 20–35 cm. alti; panicula anguste subcylindrica; rami supra medium breves (1–4 cm. longi); fructus aggregati vel in racemum dispositi; pedicelli 1.5–2 mm. longi; calyx pedicellos aequans vel superans ovoideus vel globosus; sepala interiora obscure carinata ovato-elliptica subacuta; sepala exteriora anguste lanceolata vel linearia interiora plus quam ¾ vel fere aequantia; capsula late ovoidea vel globosa 1.8–2.1 mm. longa calycem subaequantia; semina 3–5 (6) plerumque 4–5 dorso valde convexa ventre convexa vel carinata et aequilateralia 1–1.1 mm. longa.—Sandy coast of eastern New Brunswick and the islands of Miramichi Bay. I have seen the following specimens. New Brunswick: Fox Island, Miramichi, July 13, 1892, *J. Fowler* (US); South Beach, on grass (*Ammophila*)-plain, Richibucto, Kent Co., *S. F. Blake*, no. 5709; grass-plain, Kouchibouguac, Kent Co., *S. F. Blake*, no. 5727; sur les dunes, Buctouche, comté de Kent, *Victorin, Rolland-Germain & Jacques*, no. 44,651; grass (*Ammophila*)-plain, Portage Island, Northumberland Co., *S. F. Blake*, no. 5672 (type in Gray Herb.); grass (*Ammophila*)-plain, Fox Island, Northumberland Co., *S. F. Blake*, no. 5690. Map 20.

The type specimen of Pursh's *Lechea thymifolia*, which is in the Kew Herbarium, is of our *L. maritima* according to Britton[1] who, presumably, had seen the specimen since he wrote "This paper is, then, essentially based on the examination of type specimens."

Lechea maritima grows abundantly in almost pure sand along the coast and hence may usually be quickly identified. Often, however, it occurs inland in company with *L. villosa*, *L. Leggettii* or any other species whose range it overlaps and then there is, quite often, difficulty in identifying it. From *L. Leggettii* and *L. intermedia* it may be distinguished by its basal leaves, which are pilose all over beneath (not merely on midribs and margins as in those species) and by its seeds. These are inequilateral, smooth, light-colored, usually 3 in number and dorsiventrally thickened but not strongly angled, characters which effectively separate *L. Leggettii*, with its prevailingly dark-brown, equilateral and dorsiventrally compressed seeds, and *L. intermedia*, with its predominantly 5–6 seeds which are markedly keeled and have a conspicuously reticulate surface in maturity.

Lechea maritima has the type of variation mentioned in *L. tenuifolia*, giving rise to large-seeded and small-seeded phases unaccompanied by other important morphological differences and with no differences in geographical range nor even in habitat. However,

[1] Bull. Torr. Bot. Cl. xxi. 245 (1894).

types of ecological variations do occur which are not at all uniform. They embody slight changes in quantity of hairiness, quality of branching, color, etc. in inland plants which cause them to appear quite distinct from the usual maritime extreme. Dr. Robinson[1] described *L. maritima* var. *interior*, incorporating in it most of the inland smooth specimens of the species. He cited, as a type, his collection, "dry soil, Troy, N. H., no. 588." That a lessening in degree of pilosity is a result of growing inland is attested by the fact that in interior parts of Connecticut, Massachusetts and New Hampshire are plants differing in other vegetative characters from the Troy specimen, but alike in regard to degree of pilosity. It is safe to say, I feel, that inland forms in this particular character have become altered quite independently of other forms, and that the plants at Crowford Notch, for example, and in northern Connecticut, are more related to those of York County, Maine and to those of southern Connecticut, respectively, than to each other. In regard to degree of pubescence there is a tremendous range of variation among the plants growing near the sea thus eliminating the degree of pubescence, I believe, as an important character within the species. The variety *interior* covers, in my opinion, a number of unclassifiable forms.

Many of the specimens from Connecticut which have been placed in var. *interior* are probably hybrids between *L. maritima* and *L. Leggettii* var. *typica*. These are intermediate in most respects between the two parents; but, because of the fairly close resemblance in habit between the two, they are usually difficult to separate. Presumable hybrids between *L. maritima* and *L. villosa* are fairly common (see discussion of hybridity in introduction).

The variety *virginica* is best developed in Princess Anne and Norfolk Counties in southeastern Virginia. Many of the specimens are decidedly irregular in growth, having a strongly one-sided branching. This may be because the branches are usually perennial and often somewhat suffruticose. The persistent caudices send up shoots from any part, as do those of typical *Lechea maritima*, but the caudices themselves are more extensive and are suberect to procumbent. What appears, then, like an annual inclined stem with numerous branches, is a woody perennial axis from which the annual stems arise on the upper side. In itself this form of growth would not serve to separate a variety of *Lechea*. The same thing happens in *L. villosa*

[1] Rhodora, x. 34 (1908).

with, I believe, no varietal differences appearing. However, *L. maritima* var. *virginica* regularly produces two large seeds in a capsule as contrasted with the usual three of var. *typica*. Also, the resting shoots have narrower and more persistent leaves than in the var. *typica* and when developed the leaves are more pilose on the upper surface. The presence or lack of pubescence on the upper surfaces seems to be correlated with certain stages of development of the shoots of several species of *Lechea*. It is fairly conspicuous in var. *virginica* and has been noted and discussed by Kearney.[1] Briefly, he states that the leaves, when orthotropic, become isolateral. The leaves, usually hairy only above, become hairy on both surfaces when growing erect. It seems to me that the occurrence of this feature is too constant a factor in those species which show it to be explained completely in such a way. There is a strong inheritance-factor here as well and, like so many characters which seem to be direct responses to the environment, they act at times despite their environments.

In northeastern New Brunswick is an equally well marked variety of *Lechea maritima*, which I have named var. *subcylindrica* because of its very slender panicles. So close in superficial resemblance to *L. intermedia* is it that every sheet which I have seen has at some time been misidentified as that species by collectors and even by students of the genus. The basal leaves and seeds are generally characteristic of *L. maritima*. However, its narrowly subcylindric panicle of large fruits and its lanceolate to linear exterior sepals, which at times may nearly equal the interior sepals in length, serve to separate it as a well marked geographic variety. The *L. maritima* growing in southern Maine and central New Hampshire, as far north as Crawford Notch, simulates, in some respects, the New Brunswick plant, except that in New England no strong differences have developed, but only tendencies which reveal themselves in a great variability of certain characters.

At Bathurst, New Brunswick, forty miles to the north of the range of *Lechea maritima* var. *subcylindrica* is found *Aster subulatus* var. *obtusifolius* Fernald. Except for this station, *Aster subulatus* reaches its northeastern limit in York Co., Maine. Its offshoot several hundred miles to the northeast demonstrates variation comparable to that shown in this variety of *Lechea maritima*. Fernald & Griscom[2] further subdivide *Aster subulatus*, describing var. *euroauster*, giving

[1] Bot. Surv. Dismal Swamp Region in Contrib. U. S. Nat. Herb. v. 389, 390 (1901).
[2] Rhodora, xxxvii. 183 (1935).

the range as "eastern Massachusetts to Florida, . . . chiefly southern." The type is from that part of Virginia where *Lechea maritima* var. *virginica* is abundant. *L. maritima*, therefore, has a distribution in part, at least, quite like that of *Aster subulatus*.

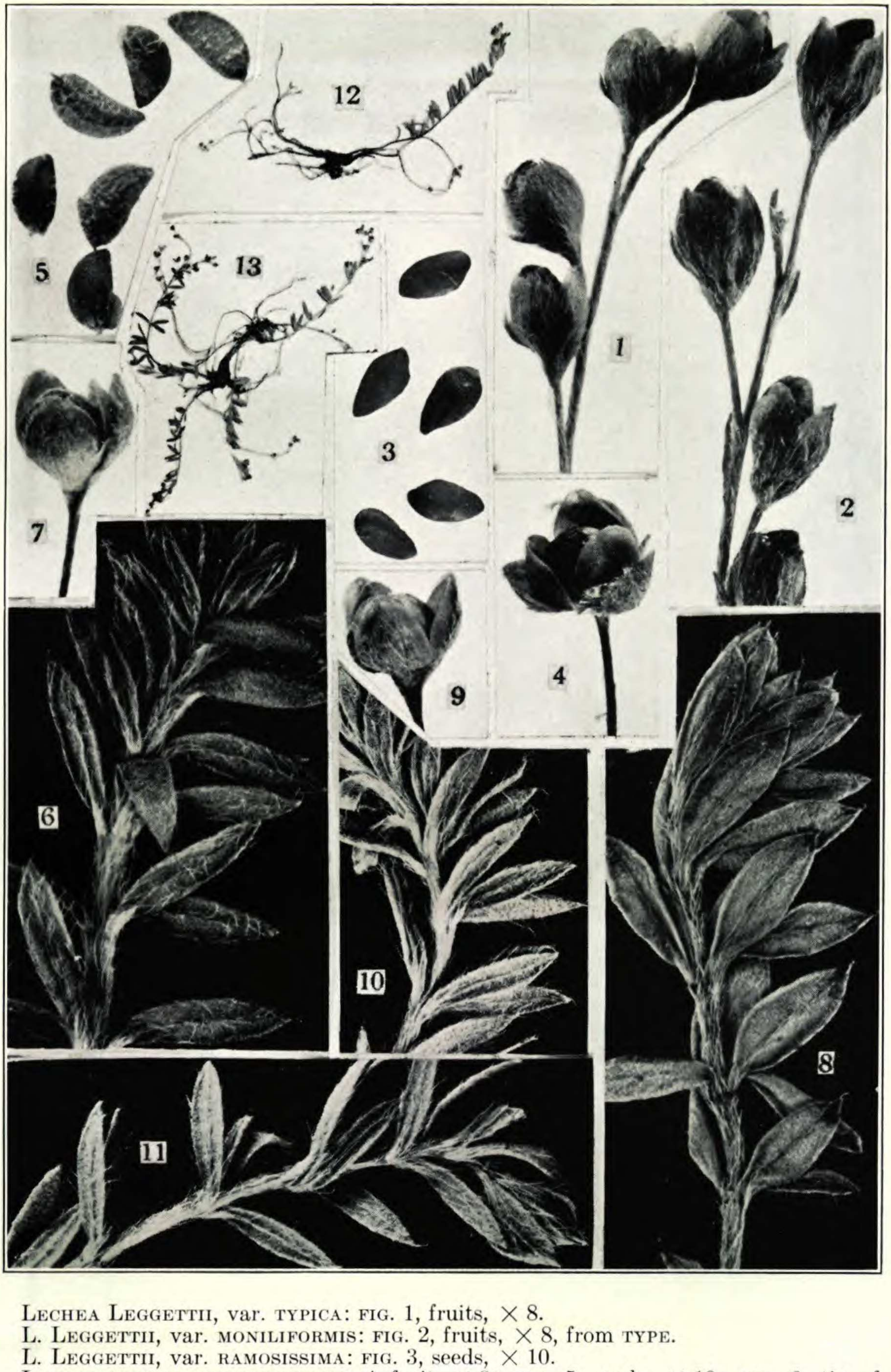
Lechea maritima has generally been considered to have a more extensive range than it actually has. Small[1] gives the range as "Massachusetts to Virginia and Georgia"; and quite recently, of its range he[2] says "Coastal Plain and New England Coast, Ga. to Me." I have seen no specimens from south of Virginia on the Atlantic Coast and none inland about the Great Lakes, although Coulter[3] and Pepoon,[4] following Hill, list the species as to be found in the Chicago area near the southern end of Lake Michigan. Peattie[5] says of the species "Rare, at Miller." The very close similarity to *L. maritima* of immature plants of *L. patula* and *L. Torreyi* in the southern United States and of *L. stricta* in the Lake Michigan region undoubtedly accounts for these doubtful records.

The fact that the range of *L. maritima* is quite restricted is of considerable interest because, on the one hand, the species is strikingly successful in competition with other plants (even appearing weedy at times) and, secondly, it is one of the more distinct of our northeastern species.

15. L. STRICTA Leggett. Caudex simple; basal shoots in mid- and late autumn, numerous, short, simple, slightly crooked, subprocumbent, 2–3 cm. long; the axis strongly subappressed- to spreading-pilose or slightly villous: basal leaves obscurely verticillate or scattered, crowded, lanceolate to lance-elliptic, attenuate to base, 0.7–1.2 mm. broad, 3–5 mm. long, glabrous above, subappressed-pilose beneath on midrib and margin: fruiting stems one to several, 25–45 cm. tall; branches above the middle, strongly ascending to suberect: panicle spire-shaped to slenderly pyramidal; the axis of young stems and immature branches tomentose, in maturity becoming densely subappressed-pilose: cauline leaves abundant, subappressed, often persisting well below the panicle, narrowly oblanceolate, attenuate to the base, abruptly pointed or acute at the apex, 1.3–2 cm. long, 1.5–3 mm. broad, glabrous above, strongly subappressed- to spreading-pilose with short flexuous hairs on midrib and margin of the lower surface, frequently sparsely pilose elsewhere beneath; rameal leaves much smaller, numerous: fruits mostly crowded-racemose: pedicels strongly

[1] Fl. Se. U. S. 799 (1903).
[2] Man. 883 (1933).
[3] Fl. Pl. & Ferns of Ind. 841 (1899).
[4] Fl. Chicago Area, 390 (1927).
[5] Fl. of Ind. Dunes, 266 (1930).

pilose, equaling to exceeding the calyx: buds tomentose: calyx in fruit subglobose, equalling to exceeding the capsule, strongly pilose with somewhat spreading pubescence; outer sepals linear, not more than two-thirds as long as the inner; inner sepals ovate to obovate, obtuse, 1.6–1.8 mm. long, 1.2–1.3 mm. broad: capsule subglobose to broadly ovoid: seeds 3–4, narrowly ovate and equilateral, dorsiventrally compressed and ventrally convex or keeled and somewhat inequilateral.—Leggett ex Britton in Bull. Torr. Bot. Cl. xxi. 251 (1894); Robinson in Gray, Syn Fl. N. Am. i^{1}. 193 (1895); Britton in Britton & Brown, Ill. Fl. ii. 444, fig. 2483 (1897); Britton, Man. 633 (1901); Grosser in Engler, Pflanzenr. iv^{193}. 138 (1903); Robinson & Fernald in Gray, Man. ed. 7: 578 (1908). *L. minor* f. *stricta* Gray in Robinson in Gray, Syn. Fl. N. Am. i^{1}. 193 (1895).—Sandy fields and woods or lake-shores and prairies, Ontario and Indiana to Minnesota and Nebraska. ONTARIO: sandy soil, Belleville, July, 1877, *J. M. Macoun;* vicinity of Belleville, August 3, 1876, *J. Macoun.* INDIANA: sandy field, North Judson, August 29, 1894, *E. J. Hill* (Field); sandy ground, Clark, September 10, 1881, *Hill* (Field); Lake Co., *Hill* (Field). WISCONSIN: Scott, Brown Co., August 6, 1899, *Schuette* (Field); Cross Plains, Dane Co., September 14, 1916, *J. R. Heddle* (Field); Dells of the Wisconsin, August, 1858, *Lapham* (NY); dry sandy slopes, near Mauston, Juneau Co., *E. J. Palmer*, no. 28,439; Camp Douglas, Juneau Co., August 13, 1891, *E. A. Mearns;* sand plain between Fountain City Slough and Waumandee Lake, Fountain City, *Fassett*, no. 3416. ILLINOIS: beach-region, north of Waukegan and east of the glacial Glenwood Ridge, Lake Co., August 14, 1908, *F. C. Gates* (Field); edge of thicket, Evanston, August 4, 1911, *E. E. Sherff;* sandy border of woods, Cook Co., August 27, 1896, *A. Chase;* Englewood, October 27, 1881, *E. J. Hill;* northern part, October 24, 1874, *Bebb*, marked *L. stricta* provisionally nov. spec. (TYPE in Herb. N. Y. Bot. Gard.); knolls in oak-openings, Fountaindale, Winnebago Co., 1873 & 1879, *Bebb; Bebb*, no. 2087 (with a letter of N. L. Britton to Bebb); sandstone region, Rock River, end of August 1874, *Bebb* (NY); dry barrens, near Byron, Fountaindale, Winnebago Co., 1877, *Bebb* (Field); Shirland, June 26, 1908, *Gleason;* Byron, Ogle Co., *Bebb* (Field); Oquawka, *Patterson* (Field); Oregon, September 1, 1888, *M. B. Waite.* MINNESOTA: Winona Co., July–October, 1897, *Holzinger* (NY); Leaf Mountain, July, 1897, *J. E. Campbell;* Lindstrom, Chisago Co., August, 1892, *B. L. Taylor* (Field); Zumbrota, Goodhue Co., August, 1892, *Ballard* (US); sandy soil, Hennepin Co., September, 1892, *Sandberg* (Field); Brainerd, August 8, 1903, *C. D. Mell* (NY); Morrison Lake, Clearwater Co., September 6, 1929, *M. L. Grant* (US); Muskoda, Red River Valley, August 12, 1901, *Ballard*, no. 3112. IOWA: Manchester, September, 1897, *C. E. Bull;* along Cedar River, Muscatine Co., September, 1892, *F. Reppert* (NY); prairies, Fayette, August, 1894, *Fink;* Jasper Co., *J. W. Preston;* Ames, November 8, 1877, *R. Burgess* (Field). NEBRASKA: Long Pine, August 16, 1899, *J. M. Bates.* MAP 21.



LECHEA LEGGETTII, var. TYPICA: FIG. 1, fruits, × 8.
L. LEGGETTII, var. MONILIFORMIS: FIG. 2, fruits, × 8, from TYPE.
L. LEGGETTII, var. RAMOSISSIMA: FIG. 3, seeds, × 10.
L. INTERMEDIA, var. TYPICA: FIG. 4, fruit, × 8; FIG. 5, seeds, × 10; FIG. 6, tip of basal shoot, × 4.
L. INTERMEDIA, var. JUNIPERINA: FIG. 7, fruit, × 8, from TYPE; FIG. 8, tip of basal shoot, × 4.
L. INTERMEDIA, var. LAURENTIANA: FIG. 9, fruit, × 8, from TYPE; FIGS. 10 and 11, portions of basal shoots, × 4, from TYPE.
L. INTERMEDIA, var. DEPAUPERATA: FIGS. 12 and 13, entire plants, × 2/5, TYPE.

This species has been difficult to separate from its near relatives, *Lechea intermedia* and *L. Leggettii*. The extremes of variation in one or more characters of *L. stricta* may grade into either of the other two species. In addition, apparent hybrids occur with these or with *L. tenuifolia*. The consequence is that the species has been the most puzzling one of the entire genus to separate and clearly to diagnose. The fruits generally resemble those of *L. Leggettii* var. *typica*, although the calyx is densely and quite prominently spreading-pilose to subvillous and the seeds are often 4 in number and quite prominently keeled, approaching in shape, not in color or markings, those of *L. intermedia*. In shape the basal leaves are quite like those of *L. intermedia* and its varieties but are conspicuously spreading-pilose to subvillous on midrib and margin. The outstanding characteristics of *L. stricta* are the strongly appressed-ascending character of the leaves and branches and the very strong pilosity of the primary stems, branches and lower surfaces of the cauline leaves. With both of these characters there is sufficient variability for confusion to occur.

The species illustrates in general the kind of specific differentiation which takes place in *Lechea*. It differs trivially from its nearest relatives in almost all the points used to separate the species in the genus. The characters of seeds, capsules, sepals, branching, general pubescence and cauline and basal leaves together form a combination that no other species can duplicate. No characters by themselves are strongly accented in any way; neither are they definitely intermediate between those of any two other species. They represent merely a progressive tendency of the whole plant to vary in a combination of characters. Similar but less striking differences are exemplified in the cases of geographic varieties of other species which, in some instances, show more striking single departures from their closest relatives than does *L. stricta* from its related species.

Lechea stricta has the center of its distribution in and about the Driftless Area in northern Illinois, northeastern Iowa, southeastern Minnesota and in southern Wisconsin. Outlying stations occur in northern Nebraska and in northwestern Minnesota in valleys of rivers tributary to the Mississippi, and in southern Ontario. The above range can be explained fairly simply by assuming the species to have survived at least the Wisconsin stage of the Pleistocene Glaciation in the Driftless Area,[1] along with such plants as *Lespedeza*

[1] Fernald, *Persistence of Pl. in Unglac. Areas of Bor. Am.* in Mem. Amer. Acad. xv. 317, 318 (1925).

leptostachya Engelm., *Talinum rugospermum* Holzinger and *Asclepias Meadii* Torrey, and to have radiated therefrom in Post-Pleistocene time. The abundance of the plant in the area about the southern end of Lake Michigan may be correlated in a general way with the presence there of numerous species and varieties of plants found elsewhere only on the Atlantic Coastal Plain or it may be the result of migration from the Driftless Area. The station in Belleville, Ontario is impossible of explanation unless we assume that the last stage of Pleistocene Glaciation represented a much less extensive but perhaps more complicated series of events than has previously been held by many geologists.

16. L. Leggettii Britton & Hollick. Caudex mostly simple: basal shoots 3–8 cm. long, slender, procumbent to suberect; the axis subappressed-pilose with gray hairs: basal leaves verticillate to subverticillate or scattered, not at all to slightly overlapping, subappressed at base to the axis, narrowly lanceolate or oblanceolate to narrowly lance-elliptic, narrowed gradually to both apex and base, acute or pointed at apex, 4–10 mm. long, 0.8–2.5 mm. broad, glabrous above, sparsely pilose beneath on midrib and margin with appressed to somewhat spreading hairs: fruiting stems frequently one, rarely many, 25–80 cm. tall: branches mostly above the middle, few to numerous, widely spreading to ascending; panicle openly to densely subcylindric to subglobose; axes of stem and branches sparsely subappressed-pilose to glabrate: cauline leaves narrowly oblanceolate to linear, attenuately narrowed at the base to the slender (1 mm. long) petiole, 1–2 cm. long, 1.5–3 mm. broad: fruits in late summer and early autumn, scatteringly racemose, long-pedicelled and secund to short-pedicelled and clustered: pedicels slender, 1.2–2.3 mm. long, shorter than to equaling or exceeding the calyx, conspicuously subappressed-pilose: calyx subglobose to slenderly pyriform, 1.6–2 mm. long, 1.3–2 mm. broad; inner sepals prominently 3-veined, not keeled, shallowly concave, broadly ovate or obovate to narrowly obovate, obtuse, conspicuously to densely subappressed- or slightly spreading-pilose; outer sepals inconspicuous, narrowly lanceolate, about two-thirds as long as the inner: capsule subglobose to ellipsoid, 1.5–2 mm. long, 1.3–1.6 mm. broad: seeds 2–3 (4), 1–1.25 mm. long, 0.5–0.7 mm. broad, medium- to dark-brown, with the embryo distinct but not conspicuous, dorsiventrally compressed and narrowly ovate, with the base enlarged and the apex subacute or dorsiventrally thickened, keeled, obscurely 3-sided and somewhat inequilateral.

a. Panicle slenderly ovoid to subcylindric; the principal branches subequal, the ultimate branches greatly reduced, bearing crowded, frequently clustered fruits: calyx in fruit light- to dark-brown, cuneate-obovoid: seeds 3–4, 1–1.1 mm. long, frequently thickened dorsiventrally and keeled . . . . . Var. *typica.*

a. Panicle subcylindric to subglobose; the branches diminishing upward, the ultimate branches several cm. in length, bearing racemes of scattered fruits: calyx in fruit brownish- to reddish-purple, pyriform, narrow to broad above: seeds 2–3, 1.1–1.25 mm. long, compressed dorsiventrally or 3-sided.

Fruiting stems up to 80 cm. high: panicles well above the middle, broadly and irregularly ovoid to globose: seeds mostly 2, dorsiventrally compressed and equilateral. Var. *ramosissima.*

Fruiting stems up to 60 cm. high: panicles at about the middle, subcylindric to slender-ellipsoid: calyx slenderly pyriform: seeds mostly 3, frequently inequilateral and 3-sided or dorsiventrally compressed..... Var. *moniliformis.*

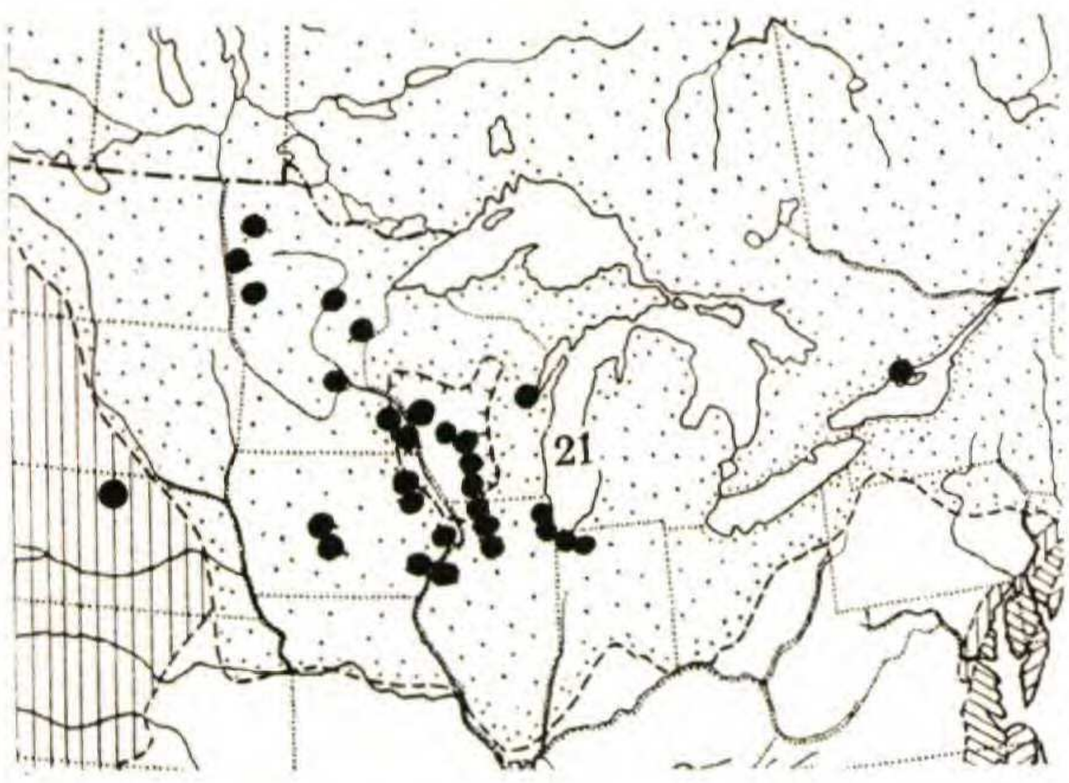
Var. **typica.** Basal leaves narrowly elliptic or oblanceolate, broadest at or about the middle, 4–8 mm. long, 0.8–1.6 mm. broad: fruiting stems 25–55 cm. high: panicle slenderly ellipsoid to subcylindric; branches at or about the middle, open to crowded, subequal, spreading, 3–8 cm. long: fruits crowded-racemose to clustered at the tips of the short ultimate branches; pedicels shorter than calyx: calyx cuneate-obovoid, 1.6–1.8 mm. long, 1.4–1.7 mm. broad, strongly pilose with fine, subappressed, gray, short hairs; interior sepals ovate to obovate, obtuse: capsule subglobose, 1.5–1.6 mm. long, hidden by the calyx: seeds 3–4, mostly 3, 1–1.1 mm. long, 0.5–0.6 mm. broad, dorsiventrally compressed and narrowly ovate or elliptic to dorsiventrally thickened and somewhat obscurely and unequally 3-sided.—*L. Leggettii* Britton & Hollick in Britton in Bull. Torr. Bot. Cl. xxi. 251 (1894); Robinson in Gray, Syn. Fl. N. Am. i[1]. 193 (1895); Britton in Britton & Brown, Ill. Fl. ii. 443, fig. 2480 (1897); Britton, Man. ed. 1: 633 (1901); Grosser in Engler, Pflanzenr. iv[193]. 138 (1903); Small, Fl. 799 (1903); Robinson & Fernald in Gray, Man. ed. 7: 579 (1908); Stone, Pl. So. N. J. ii. 562, pl. 83, fig. 5 (1911); N. Taylor, Fl. Vic. N. Y. City, 44 (1915); Small, Man. 883 (1933). *L. minor* sensu Pursh, Fl. Am. Sept. i. 91 (1814), in part; and of many early Am. authors, probably, in part; not L.—Dry woods, sterile fields, pond-shores, etc., mostly inland, eastern Massachusetts to Virginia and Ohio. The several varieties of *L. Leggetti*, although distinct enough in the major parts of their ranges, intergrade rather more than do those of any other species of the genus. For this reason, and because in the southeastern states there is a fancied resemblance (as indicated by identifications from that area) of var. *ramosissima* to one or more other species, it seems wise to include citations of representative specimens of all. Massachusetts: border of Purgatory Swamp, Dedham, July 23, 1909, *Wiegand;* dry woods, Scituate, September 13, 1914, *C. H. Knowlton;* dry sandy clearing, Lakeville, *Fernald & Long*, no. 9961; New Bedford, September 21, 1910, *Hervey;* Nonquit, Bristol Co., August 3, 1904, *Hervey;* dry woods, Chilmark, Dukes Co., *J. A. Cushman*, no. 7530. Rhode Island: sandy soil, Bold Water Point, Providence, September 7, 1906, *J. F. Collins;* dry pond-shore, Rich-

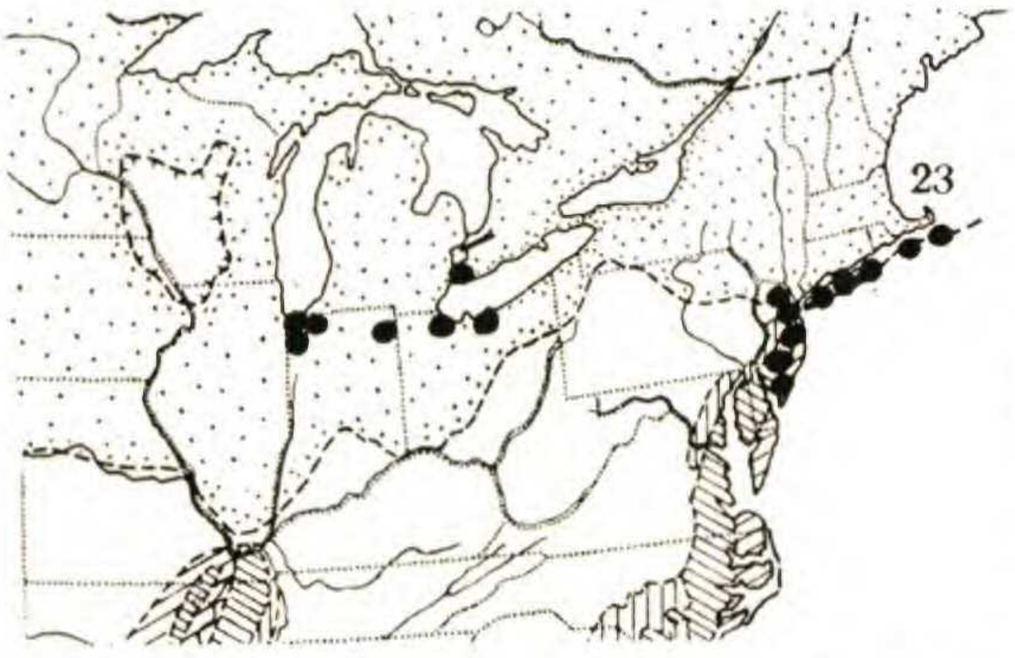
mond, Washington Co., August 30, 1919, *Fernald & Collins;* dry woods north of Ashaway, Hopkinton, Washington Co., September 1, 1919, *Fernald, Woodward & Collins.* CONNECTICUT: damp soil, Great Oak Farm, Ledyard, August 28, 1920, *Graves & Woodward;* Groton, New London Co., September 1, 1897, *Graves;* Hartford, 1900, *H. J. Koehler;* open roadsides, Cromwell, Middlesex Co., October 16, 1919, *C. F. Batchelder;* dry barren ground, Southington, September 25, 1897, *Bissell;* near Wintergreen Lake, New Haven, October 13, 1903, *Woodward;* Trumbull, Fairfield Co., August 4, 1892, *Averill.* NEW YORK: Eaton's Neck, Long Island, September, 1887, *T. Hogg* (NY); dry ground, Lakeville, Hempstead, Long Island, September 13, 1901, *J. R. Churchill;* Staten Island, November 10, 1872, *Leggett;* Court House, New Dorp, Staten Island, September 5, 1877, *Leggett* (NY); Princes' Bay, Staten Island, October 6, 1894, *T. H. Kearney,* Jr. (NY). NEW JERSEY: Bergen Point, October 7, 1876, *Leggett* (TYPE in Herb. N. Y. Bot. Gard.); Monmouth Co., September 10, 1876, *Leggett;* sandy wood, Red Bank, September 10, 1875, *Leggett;* Leedsville, September 10, 1876, *Leggett.* PENNSYLVANIA: grassy scrubby sides of a road, near Slatington, Lehigh Co., *Pretz,* no. 13,156; Buckingham Mountain, Bucks Co., July 23, 1917, *C. D. Fretz;* sandy woods, north of Malvern, Chester Co., *E. B. Bartram,* no. 1202; Jerseytown, Columbia Co., July 25, 1889, *Heller;* New Red Sandstone, South Mountain, Penryn, Lebanon Co., *Heller,* no. 502; Smithville, Lancaster Co., October 18, 1890, *Small;* barrens of Huntington Co., August, 1876, *J. R. Lowrie* (Field). DELAWARE: thin soil, near Wilmington, September 15, 1899, *Canby;* dry soil, Stanton, September 16, 1897, *Commons;* Harrington, 1872, *Canby* (NY). MARYLAND: Emmetsburg, 1828–1834, *J. Hall* (Field). VIRGINIA: dry sandy field, Clarendon, *S. F. Blake,* no. 10,864; dry soil, Gordonsville, September 1, 1890, *F. Blanchard* (Mo); region about Mount Crawford, Rockingham Co., 1200–1500 ft. alt., *Heller & Halbach.* OHIO: Newell Ledge, Portage Co., *R. J. Webb,* no. 815. PLATE 491, FIG. 1; MAP 22.

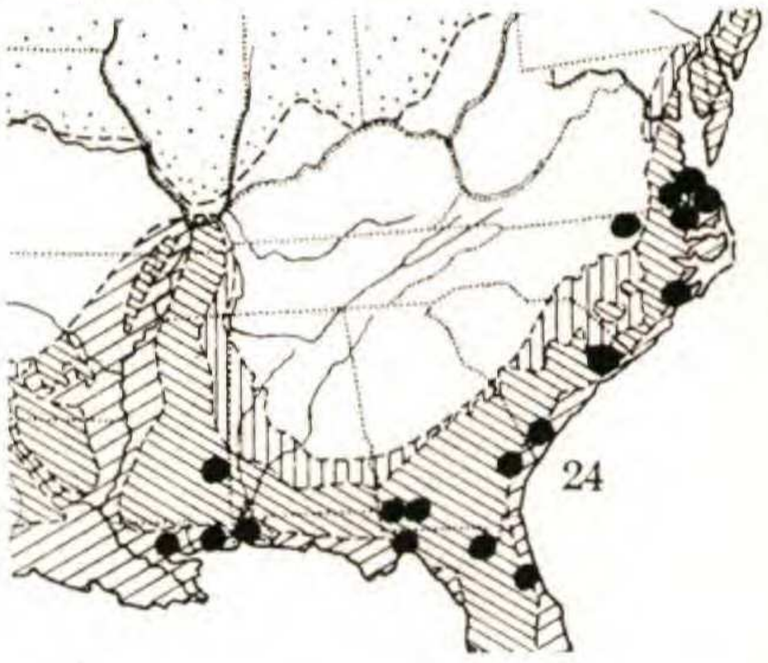
Var. **moniliformis** (Bicknell), comb. nov. Basal leaves lanceolate to lance-elliptic, 6–10 mm. long, 1.5–2.7 mm. broad: fruiting stems 25–60 cm. high: panicle slenderly and compactly cylindric-paniculate with short spreading branches to subglobose with openly spreading-ascending to erect branches; branches subequal to very unequal, 5–15 cm. long, often shorter toward the apex: fruits loosely racemose on long (several cm.) secondary or tertiary branches: pedicels 1.8–2.3 mm. long, nearly equaling to slightly exceeding the calyx: calyx reddish-purple, pyriform (often slenderly so), 1.7–2 mm. long, 1.2–1.4 mm. broad, conspicuously subappressed-pilose with rather long white hairs; interior sepals narrowly obovate, obtuse: capsule ovoid, 1.7–2 mm. long, 1.3–1.6 mm. broad, not completely concealed by and frequently slightly exceeding the calyx: seeds 2–4, mostly 3, 1.1–1.2 mm. long, 0.6–0.7 mm. broad, subequilateral, dorsiventrally compressed, broadest near the base, tapering above to the subacute or

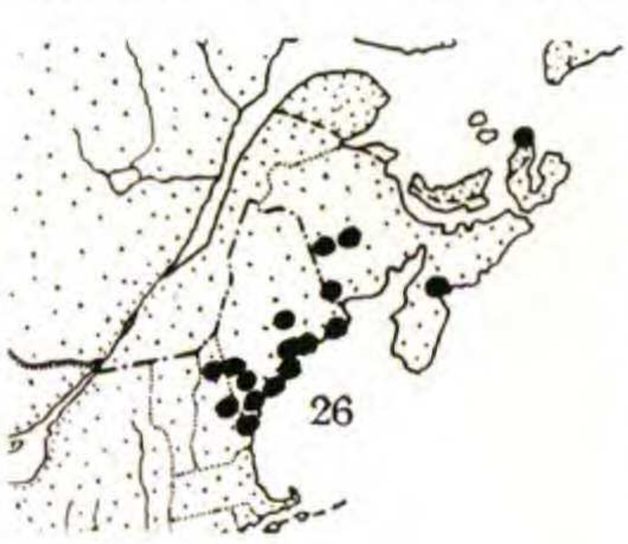
narrowly obtuse apex, or 3-sided and quite inequilateral.—*L. moniliformis* Bicknell in Britton, Man. 632 (1901); Britton in Britton & Brown, Ill. Fl. ed. 2, ii. 544 (1913).—Open woods, margins of bogs, sandy areas, frequently in damp situations. On the Atlantic Coastal Plain from Nantucket Island to southern New Jersey; in Ohio and Ontario near Lake Erie and in Indiana near Lake Michigan. The following specimens are typical. MASSACHUSETTS: Chappaquidick Island, October 5, 1911, *E. P. Bicknell* (NY); Tom Never's Head, Nantucket, August 23, 1896, *F. S. Collins;* Squam, Nantucket Island, September 18, 1899, *Bicknell* (TYPE in Herb. N. Y. Bot. Gard.); head of Tom Never's Swamp, Nantucket Island, August 31, 1904, *Bicknell* (NY). NEW YORK: East Hampton, Long Island, *Ferguson,* no. 7316 (NY); Greenport, Long Island, *Ferguson,* no. 3393 (NY); Laurelton, Long Island, *Ferguson,* no. 4706 (NY); Hempstead, Long Island, September 9, 1919, *Ferguson* (NY); low grounds, Rosedale, Long Island, October 25, 1902, *Bicknell* (NY); borders of Oak Island, in salt meadows, Woodmere, Long Island, November 6, 1906, *Bicknell* (NY); Rockville Centre bog, August 22, 1903, *Bicknell* (NY). NEW JERSEY: Closter, *C. F. Austin;* Spring Lake, July, 1834, *Lighthipe* (NY); Avon, Monmouth Co., October, 1922, *Mackenzie* (NY); dry clearings, Somers Point, *Mackenzie,* no. 7391 (NY); vicinity of Batsto, *Standley & Killip,* no. 7574; Egg Harbor, September 19, 1897, *Pollard* (NY); sandy roadside at Mullica River, Burlington Co., *F. J. Hermann,* no. 3937; open pine woods, Maple Crossway, Atsion, Burlington Co., August 10, 1926, *Benner, Long & Bassett;* Pine Barrens, near Shamong, Burlington Co., August 6, 1887, *C. F. Parker.* ONTARIO: woods, Sandwich, July 25, 1901, *J. M. Macoun,* no. 34,072a. OHIO: prairie, Oxford Springs, Erie Co., August 31, 1902, *Moseley* (US); Perkins, Erie Co., September 28, 1898, *Moseley* (US); 2¾ miles northwest of Whitehouse, Lucas Co., October 19, 1919, *Moseley;* Neapolis, Lucas Co., September 18, 1927, *Moseley.* INDIANA: shore of the pre-glacial Lake Maumee, 3 miles south of Fort Wayne, Allen Co., *Deam,* no. 14,526; dry sandy fields, North Judson, Starke Co., August 29, 1894, *E. J. Hill* (NY); dryish sands bordering sloughs, Dune Park, November 27, 1905, *Hill* (Field); moist sands, Dune Park, November 27, 1905, *Hill* (Field); Millers, Lake Co., October 1, 1881, *Hill* (NY); in a black oak woods, just west of Thayer, Newton Co., *Deam,* no. 21,395. PLATE 491, FIG. 2; MAP 23.

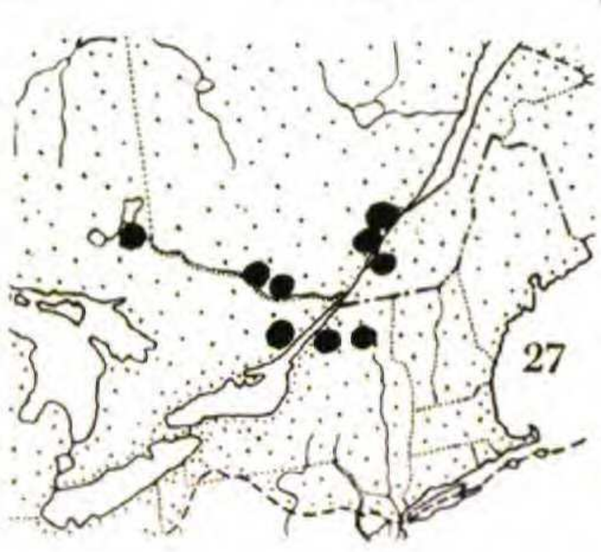
Var. **ramosissima,** var. nov. Rami basilares eis varietatis typicae similes sed pauciores; caules fructiferi 35–80 cm. alti; panicula valde supra medium caulem subdeltoidea vel globosa; rami inferiores saepe longissimi valde patuli; fructus in racemos sparsos dispositi, rami fructiferi longissimi; pedicelli calyces superantes; calyx purpureo-viridis cuneato-obovoideus 1.6–1.8 mm. longus et latus capsulam non obscurans; sepala interiora quam valvae angustiora; semina 2 (3), 1–1.2 mm. longa dorsiventraliter compressa anguste ovoidea subaequilateralia.—Open woods, sandy and peaty areas, dry or damp

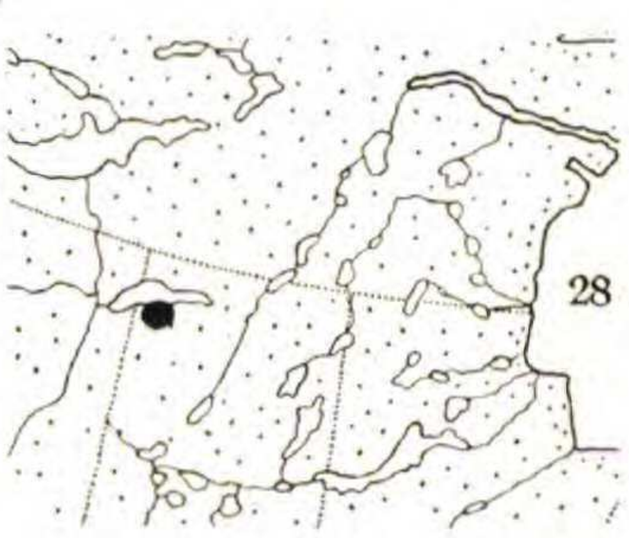












MAP 21, range of LECHEA STRICTA; 22, of L. LEGGETTII, var. TYPICA; 23, of L. LEGGETTII, var. MONILIFORMIS; 24, of L. LEGGETTII, var. RAMOSISSIMA; 25, of L. INTERMEDIA, var. TYPICA; 26, of L. INTERMEDIA, var. JUNIPERINA; 27, of L. INTERMEDIA, var. LAURENTIANA; 28, of L. INTERMEDIA, var. DEPAUPERATA.

situations, Atlantic Coastal Plain, eastern Virginia to Florida, west to Louisiana. The following specimens are characteristic. VIRGINIA: border of woods, south of Melfa, Accomac Co., *Fernald, Long & Fogg,* no. 5379; bushy clearings and borders of woods, west of Hampton, *Fernald, Long & Fogg,* no. 4949; dry pine barrens, Cape Henry, *Fernald & Griscom,* no. 2854; near Virginia Beach, *T. H. Kearney,* Jr., no. 2041 (US); Virginia Beach, September 15, 1907, *Bartram & Long* (US); pine woods, Virginia Beach, *Fernald & Long,* no. 4050; damp sandy and peaty depressions back of the dunes, Rifle Range, south of Rudy Inlet, Princess Anne Co., *Fernald & Long,* no. 4048; dry woods, Creeds, Princess Anne Co., *K. K. Mackenzie,* no. 1786 (NY); dry pine woods, Macon's Corner, Princess Anne Co., *Fernald & Griscom,* no. 2855; dry pinelands about 4 miles northwest of Waverly, *Fernald & Long,* no. 6283; moist pinelands and clearings southeast of Waverly, *Fernald & Long,* nos. 7537 and 7538. NORTH CAROLINA: Edenton, Chowan Co., *Kearney,* no. 1885 (US); sandy banks, near Beaufort, *I. F. Lewis,* no. 185 (NY). SOUTH CAROLINA: damp mucky peaty open thicket, 2 miles north of Lake City, Florence Co., *Wiegand & Manning,* no. 2069. GEORGIA: damp sandy scrubby field, Liberty Co., *Wiegand & Manning,* no. 2071; rather dry pine-barrens, Thomas Co., *Harper,* no. 1177; near Brinson, Decatur Co., *Harper,* no. 1927 (US). FLORIDA: St. Augustine, winter of 1872–73, *M. C. Reynolds* (NY); Flatwoods, Lake City, Columbia Co., *Nash,* no. 2185 (NY); pine-barrens, St. Marks, *Curtiss,* no. 6847. ALABAMA: Spring Hill, August 9, 1897, *Bush,* no. 160 (NY). MISSISSIPPI: dry sandy soil, Waynesboro, October 2, 1896, *Kearney* (NY); Ocean Springs, Jackson Co., *Pollard,* no. 1109 (TYPE in Gray Herb.); Biloxi, July 23, 1897, *C. F. Baker,* no. 698 (NY). LOUISIANA: open pine land, 1 mile north of Abita Springs, Saint Tammany Parish, *F. W. Pennell,* no. 4162 (NY). PLATE 491, FIG. 3; MAP 24.

Lechea Leggettii had been included by many, perhaps most, of the American authors before Leggett in the "protean L. minor" to use the words of Britton. Its close resemblance to *L. intermedia* is shown by the fact that it was not until the appearance of Britton's monograph that they were separately described. Britton[1] cited "*Lechea minor* Lam. Tabl. Encycl. T. 52, fig. 1 (1791)" as a synonym of his *L. Leggettii.* The difficulty of assigning this to any particular species of *Lechea* has been discussed under *L. minor* and unless Britton had seen the type-specimen of Lamarck (which he does not state) it seems to me that his inclusion of it here is but a matter of guesswork. I prefer to disregard it. Britton, p. 251, states that the types of *L. Leggettii* are in the Columbia College Herbarium. These include, presumably, the specimens there assembled by Leggett, Britton and

[1] Bull. Torr. Bot. Cl. xxi. 251 (1894).

perhaps other early collectors. Practically all of them are what I call var. *typica* and consequently the selection of a type for this variety is a relatively simple matter. It is interesting to note that Bicknell,[1] speaking of *L. Leggettii*, wrote " I take to be typical of the latter the plant that I used to find among the hills and rocky outcroppings along the Hudson near New York and which, found also in New Jersey and on Staten Island, largely make up the material studied by Leggett and by Britton & Hollick."

Like *Lechea intermedia*, *L. Leggettii* is quite variable and to a slight extent, at least, migrating into recently glaciated territory inland from the Coastal Plain.

Lechea Leggettii var. *moniliformis* comprises the greater part of the species on Nantucket Island, Long Island, in southern New Jersey and around Lake Erie and Lake Michigan. It is characterized by the possession of basal leaves larger and broader than in the var. *typica*, by having the fruits disposed evenly in racemes (not usually crowded or condensed towards the tips of the branches as in the var. *typica*), and by having the calyx much longer than broad and distinctly pyriform and purplish in color (not cuneate-obovoid and brownish-green as in the var. *typica*). Bicknell[1] says of this variety "The type specimens, as well as others like them from Long Island, mark a pronounced departure from typical *L. Leggettii*. Other specimens from Nantucket and Long Island are less distinctive and I am in doubt whether it is well to rate the plant as other than a variety of the common species. Nevertheless, it has points of distinction which need no second glance to impress anyone who may be familiar with the common inland form of the species, for *L. moniliformis* would appear to be a plant of the coastal plain . . . Moreover it shows this difference in habit from the more inland plant of dry open places and hilly ground, that it is of low grounds often of wet and brackish soils. A better knowledge may show that its distinctive name should be restored, but for the present let it be merged with *L. Leggettii*." In further support of this plant being a good variety is the fact that practically all of the specimens from northern Ohio, near Lake Erie, and from near the southern end of Lake Michigan in Indiana have the characters belonging to it. The plants of these areas, particularly of that at the southern end of Lake Michigan, frequently show a strong relation to or identity with the flora of the Coastal Plain. Bicknell

[1] Bull. Torr. Bot. Cl. xl. 619 (1913).

was prone to make too much of slight differences between Lecheas. His *L. juniperina*, which after much field- and laboratory-study, I regard as a strong geographic variety, differing in several details from the species, is an example of his view of what constitutes a species. When, as in this instance, he felt that there was much intergrading between *L. Leggettii* and his *L. moniliformis* he combined the two rather than make a formal variety of the latter.

The decidedly disrupted distribution along the Coastal Plain and the considerable segregation of the Great Lakes area indicates a considerable age for the variety and a segregation and isolation since the downwarping of the northern Coastal Plain.

The widely distributed var. *ramosissima* of the Coastal Plain from Virginia to Florida and west to Louisiana is more nearly related to var. *moniliformis* than to var. *typica.* It differs from the former in having a less elongate calyx and a more broadly branched habit and typically 2, rather than 3, seeds in a capsule, differences which serve to separate it as a geographic variety. In habit the plant is rather close to *L. Torreyi* which, of course, is easily distinguished by the strong gray pilosity on the calyces and by the 4–6 seeds.

17. L. INTERMEDIA Leggett. Caudex mostly simple: basal shoots in late August to November, subprocumbent to assurgent, 2–7 (commonly 3–5) cm. long; the axis sparsely to densely subappressed-pilose: basal leaves elliptic- to oblong-lanceolate, sparingly to inconspicuously subappressed-pilose on midrib and margin on the lower surface, glabrous on the upper, 3–7 (–8) mm. long, 0.8–2 mm. wide, 2-ranked and mostly in one plane, parallel to the ground or broadly spreading from all sides of the shoot, scattered or subverticillate to verticillate: fruiting stems one to many, 15–60 cm. high, branching mostly above the middle, often in the upper third: panicles narrowly subcylindric to spire-shaped; branches short, openly spreading-ascending, 2–8 cm. long or crowded and strongly ascending to suberect: cauline leaves oblanceolate, abruptly acute to pointed, 1–2.5 cm. long, 1.5–4.5 mm. broad, glabrous on the upper surface, with short subappressed prominent to inconspicuous hairs on the midrib and margin on the lower surface; rameal leaves similar but smaller and more narrowly lanceolate: axes of stem and branches finely subappressed-pilose: fruits secund or clustered at the tips of the branches: pedicels sparsely subappressed-pilose with very short hairs, 1.5–3 mm. long, of the clustered fruits frequently shorter: calyx prominently appressed-pilose, ovoid to globose and somewhat pyriform or depressed-globose, 1.9–2.3 mm. broad, 1.9–2.1 mm. long; the interior sepals not keeled, 3–5-nerved, ovate, obtuse, about as broad as long, or 3-nerved, elliptic, subacute and longer than broad; outer sepals inconspicuous, linear, from one-

half to three-quarters as long as the inner: stamens of an indefinite number; capsule broadly ovoid to depressed-globose, 1.9–2 mm. long, 1.8–2.1 mm. broad: seeds pale- to medium-brown, when mature with a thin membranaceous coat mostly adhering closely but in places drawn away, forming a reticulum, 4–6 in number, 1.1–1.3 mm. long, 0.6–0.75 mm. broad, 3-sided and prominently angled, considerably broadened and thickened toward the base or with base and apex similar, the dorsal surface strongly convex, the two lateral faces nearly flat, subequal to quite unequal, converging sharply in a straight keel.

a. Calyx and mature capsules depressed-globose; the capsule conspicuous, equaling to exceeding the calyx: interior sepals broadly ovate, obtuse or subobtuse, 5–3-veined: panicles mostly openly branched: capsules opening in mid- to late autumn..... Var. *typica.*

a. Calyx and mature capsules globose to broadly ellipsoid: calyx slightly pyriform, exceeding the capsule: interior sepals elliptic-ovate and subacute, 3-veined: plants densely and closely branched: capsules opening in early autumn....*b.*

b. Fruiting stems suberect to erect, more than 12 cm. long. Basal leaves sparsely subappressed- to spreading-pilose on midrib and margin beneath from the first, becoming nearly or quite glabrous on the margin, the midrib remaining slightly pilose, frequently 4-ranked, in conspicuous approximate to remote whorls, elliptic-lanceolate, uniformly narrowed to the acute apex and base, 3 (frequently) to 5 times as long as broad. Var. *juniperina.*

Basal leaves at first strongly subappressed to spreading-pilose beneath, retaining a prominent pilosity on midrib and margin, mostly 2-ranked in crowded obscure whorls or scattered, lanceolate to oblanceolate, more than 4 times as long as broad..... Var. *laurentiana.*

b. Fruiting stems decumbent to arched-ascending, less than 12 cm. long..... Var. *depauperata.*

Var. **typica.** Basal shoots 2–6 cm. long, mostly subprocumbent; the axis strongly subappressed-pilose: basal leaves oblong to lanceolate, acute, abruptly narrowed at base and apex, mostly dull-green, conspicuously subappressed- to spreading-pilose on the lower surface on midrib and margin, 3–7 (–8) mm. long, about one-fourth as broad, spreading mostly in one plane, subverticillate, whorled or scattered but appearing as though 2-ranked and not whorled: fruiting stems one to several, 15 cm. (occasionally in one-year plants) to 60 cm. tall; the branches spreading-ascending, 3–8 cm. long: panicles open, subcylindric: fruits scattered along the primary or secondary branches or loosely clustered toward their tips: cauline leaves spreading, those below the inflorescence falling early: pedicels 1.5–3 mm. long: calyx of the fruit mostly depressed-globose, broadest near the base, 2.1–2.3 mm. broad, about 2 mm. long; inner sepals broadly ovate, obtuse; capsule exceeding the calyx, 1.9–2 mm. long, 2–2.1 mm. broad: seeds 4–6 (mostly 5–6), 1.1–1.2 mm. long, about 0.6–0.7 mm. broad, broad-

ened and thickened toward the base, the two lateral faces unequal, that appressed to the dissepiments slightly rounded.—*L. intermedia* Leggett in Britton in Bull. Torr. Bot. Cl. xxi. 252 (1894); Robinson in Gray, Syn. Fl. N. Am. i[1]. 193 (1895); Britton in Britton & Brown, Ill. Fl. ii. 444, fig. 2481 (1897); Britton, Man. 633 (1901); Grosser in Engler, Pflanzenr. iv[193]. 139 (1903); Robinson & Fernald in Gray, Man. ed. 7: 578 (1908); Victorin, Fl. Laurent. 271 (1935), in part. *L. minor* sensu Pursh, Fl. Am. Sept. ii. 91 (1814), at least in part; sensu Hooker, Fl. Bor. Am. i. 72 (1830); sensu Watson in Gray, Man. ed. 6: 77 (1890), in part; not L.; probably *L. minor* of most other early Am. authors, in part, not L. *L. Leggettii* var. *intermedia* Britton & Hollick, Prelim. Cat. Pl. N. J. 6 (1888), name only.—Dry open woods and sterile fields, Prince Edward Island and Nova Scotia to the mountains of Virginia, west to Minnesota, the Black Hills of South Dakota and northern Nebraska (along the Atlantic slope mostly inland). The inclusion of the following citations from New Brunswick, Nova Scotia, Maine and New Hampshire, where their ranges may coincide, will serve to make more clear the distinctions between var. *typica* and var. *juniperina*. It is unnecessary to cite material from west and south of the range of the latter. NEW BRUNSWICK: Kent Co., July 22, 1870, *J. Fowler;* Kouchibouguac, October 6, 1873, *Fowler;* Escuminac, Miramichi, August 11, 1894, *Fowler* (US). NOVA SCOTIA: Boylston, July, 1890, *C. A. Hamilton*, no. 18,304; dry barren hillsides, Kentville, Kings Co., August 22, 1902, *Fernald;* near Mahone Bay, autumn of 1891, *Hamilton*, no. 18,431; dryish open sand plains, Middleton, Annapolis Co., *Fernald, Pease & Long*, no. 21,890; dry rocky or gravelly barrens, near Clement Pond, Barrington, Shelbourne Co., *Fernald, Long & Linder*, no. 21,894; dry rocky barrens, Pubnico, Yarmouth Co., *Fernald, Long & Linder*, no. 21,895. MAINE: gravelly bank, Veazie, Penobscot Co., August 19, 1897, *Fernald;* dry thicket, Milford, Penobscot Co., *Fernald & Long*, no. 14,122; Schoodic Peninsula, *Redfield*, no. 15,327 (Mo); Mount Desert, August 20, 1897, *E. P. Bicknell* (NY); among blueberry bushes, Blue Hill, Hancock Co., *A. R. Hodgdon*, no. 689; Deer Isle, Deer Island, Hancock Co., *Hodgdon*, no. 694; roadside, Camden, August 9, 1902, *G. G. Kennedy;* Cumberland, September 25, 1858, *J. Blake* (Field); York Harbor, August 21, 1896, *Bicknell;* damp roadside, South Berwick, *Hodgdon*, no. 478. NEW HAMPSHIRE: dry sandy bank, Dalton, Coos Co., *A. H. Moore*, no. 4366; sand plain, South Tamworth, Carroll Co., *Hodgdon*, no. 505; Holderness, October 8, 1886, *E. & C. E. Faxon;* sandy river terraces above Plymouth, Grafton Co., *Fernald*, no. 11,809; white pine woods, Milton, Strafford Co., *Hodgdon*, no. 687; lichen barrens in open pine woods, near Piscataqua River, *Hodgdon*, no. 700; Heniker, *B. L. Robinson*, no. 900; Jaffrey, *Robinson*, no. 44. The TYPE in Herb. N. Y. Bot. Gard. is the specimen of *T. C. Porter*, Pocono Mountain, Monroe Co., August 23, 1859. PLATE 491, FIGS. 4–6; MAP 25.

Var. JUNIPERINA (Bicknell) Robinson. Basal shoots in August and early September; the axis sparingly subappressed- to spreading-pilose: basal leaves mostly 4-ranked, elliptic-lanceolate, acute, 3–4 times as broad as long, bright-green, sparsely subappressed-pilose beneath mostly on the margin: branches of the inflorescence crowded, often strongly ascending, forming, often, a dense spire-like inflorescence: fruits mostly crowded on the upper halves of branches; calyx subglobose to slightly pyriform, broadest at about the middle: sepals ovate to elliptic-ovate, subacute, exceeding the capsule: capsules subglobose; valves oblong-ovate, broadly spreading in maturity: seeds 5–6, slightly enlarged at the base, nearly equilateral, 1–1.1 mm. long.—*L. juniperina* Bicknell in Bull. Torr. Bot. Cl. xxiv. 88 (1897); Britton in Britton & Brown, Ill. Fl. ii. 444, fig. 2482 (1897); Britton, Man. 633 (1901); Britton in Britton & Brown, Ill. Fl. ed. 2, ii. 545, fig. 2921 (1913).—Open woods and fields in poor soil, Cape Breton Island to southern New Hampshire, near the sea or in river-valleys, particularly abundant on headlands and islands of the Maine Coast. NEW BRUNSWICK: Grand Lake, September 16, 1879, *J. Fowler;* by the St. John River, Upper Queensbury, York Co., *Fernald & Pease*, no. 25,182; dry soil, St. Andrews, August 22, 1909, *A. B. Klugh*, no. 14. NOVA SCOTIA: sand dunes, Dingwall, Cape Breton Island, *G. E. Nichols*, no. 1897; dry rocky barrens, Armdale (Dutch Village), Halifax Co., *Fernald, Bartram & Long*, no. 24,171. MAINE: gravel and ledges, Pushaw Bridge, Oldtown, Penobscot Co., September 18, 1897, *Fernald;* dry field, Newburg, September 7, 1904, *O. W. Knight*, no. 92; dry sand, Strong, Franklin Co., August 13, 1901, *C. H. Knowlton;* Gilead, August 7; 1897, *K. Furbish;* Screw Auger Falls, Grafton Notch, July 26, 1895, *E. F. Williams;* Roque Bluff, Washington Co., August 28, 1924, *C. H. Knowlton;* blueberry-barrens, Machias, Washington Co., *A. R. Hodgdon*, no. 692; roadsides, Northeast Harbor, Mount Desert Island, *Redfield*, no. 16,066 (NY); Blue Hill, Hancock Co., *Hodgdon*, no. 690; Stonington, Deer Island, Hancock Co., *Hodgdon*, no. 695; Matinicus, Knox Co., *C. A. E. Long*, no. 81; dry ground, Monhegan Island, Lincoln Co., August 27, 1921, *J. R. Churchill* (Mo); Sawyers Island, Boothbay, Lincoln Co., *Hodgdon*, no. 486; sterile, rocky field, Pemaquid, *Hodgdon*, no. 487; sandy soil, Auburn, July, 1898, *E. D. Merrill* (NY); sandy barren, Cape Popham, Sagadahoc Co., August 6, 1894, *Fernald;* damp, rocky roadside, Harpswell, *Hodgdon*, no. 484; Deering, October 7, 1878, *G. E. Davenport* (NY); meadow, near Fortune Rocks, Biddeford, August 26, 1899, *G. G. Kennedy;* downs, near the sea, York Harbor, August 13, 1892, *Bicknell;* in white sands on the shore, York Harbor, August 19, 1894, *Bicknell* (part of TYPE) (NY); York Harbor, August 23, 1894, *Bicknell* (part of TYPE) (NY); dry sterile field along highway, Wells, *Hodgdon*, no. 467; sandy roadside, toward Berwick, North Berwick, *Hodgdon*, no. 470. NEW HAMPSHIRE: Shelburne, October 11, 1902, *W. Deane;* gravelly soil, Prospect Ledge, Gorham, *A. H. Moore*, no. 4273; dry

sterile soil, Dover Point, Dover, Strafford Co., *Hodgdon*, no. 499; summit, Mount Major, Alton, *H. E. Sargent*, no. 36; dry roadside, Exeter, Rockingham Co., *A. S. Pease*, no. 14,028; roadside near sea, Rye, Rockingham Co., *Hodgdon*, no. 724. PLATE 491, FIGS. 7 and 8; MAP 26.

Var. **laurentiana**, var. nov. Folia ramorum basilarium obscure verticillata vel alternata plerumque dense disposita lanceolata vel anguste oblanceolata, plus quam 4-plo longiora quam lata, costa et margine subtus valde pilose pilis subadpressis vel patulis; panicula anguste subcylindrica compacta; rami breves valde ascendentes; fructus glomerati vel in racemum densum dispositi; calyx subpyriformis capsulam ovoideam vel subglobosam superans; sepala elliptico-ovata subacuta.—*L. intermedia* Victorin, Fl. Laurent. 271 (1935), in greater part.—Dry, mostly sandy soil, open woods, river-banks and lake-shores, valleys of the upper St. Lawrence and Ottawa Rivers and along the tributaries of the St. Lawrence River in New York and Ontario. QUEBEC: sur les grands plateaux de sable, près des Trois Rivières, Les Forges, *Victorin*, no. 18,530; sand plains northwest of Three Rivers, Cap Magdaleine, Champlain Co., August 1, 1923, *Chamberlain & Knowlton;* champs sablonneux abandonnés, Saint-Joseph-de-Sorel, *Victorin*, no. 28,080; along railroad, vicinity of Longueuil, *Victorin*, no. 8319 (TYPE in Gray Herb.); les Grèves, sur les sables à la lisière du bois, De Verchères, Contrecoeur Co., *Victorin & Rolland-Germain*, no. 33,922; sur les sables du terrain de la pépinière, Berthier, *Victorin & Rolland-Germain*, no. 44,615; rivage du Lac Lapêche, Wakefield, *Rolland-Germain*, no. 25,235; shores of Ottawa River, Blueberry Point, Aylmer, *Rolland-Germain*, no. 6223; Lac McGregor, environs d'Ottawa, *Victorin*, no. 10,117; Waltham, Comté de Pontiac, *Victorin, Rolland-Germain & Mellieur*, no. 44,049. NEW YORK: on Cambrian (Potsdam) sandstone or Aridondack gneiss, Narrows Island, Black Lake, St. Lawrence Co., *Fernald, Wiegand & Eames*, no. 14,393; sandy shore, Long Lake, Hamilton Co., *House*, no. 18,509. ONTARIO: Petawawa, Comté de Renfrew, *Victorin, Rolland-Germain & Meilleur*, no. 45,364; dry cliffs, Cattle Island, Temagami Forest Reserve, *W. R. Watson*, no. 1276; near Smuggler's Cove, Leeds Co., September 4, 1905, *E. P. Bicknell* (NY). PLATE 491, FIGS. 9–11; MAP 27.

Var. **depauperata**, var. nov. Caules fructiferi numerosi decumbentes vel arcuato-ascendentes 3–12 cm. longi ramosi vel simplices, rami valde ascendentes vel adpressi 1–3 cm. longi; rami steriles basilares numerosi brevissimi 0.5–2 cm. longi; folia 1.5–3 mm. longa late aut anguste lanceolata vel oblanceolata acuta; folia caulina brevissima dense disposita subadpressa oblanceolata 5–7 mm. longa 0.8–1.5 mm. lata; fructus pauci pyriformes.—Represented by a single collection from western Canada. SASKATCHEWAN: in old burn, open woods of small Jack Pines, near Archibald River, south shore of Lake Athabasca, July 31, 1935, *H. M. Raup*, no. 6745 (TYPE in Gray Herb.). PLATE 491, FIGS. 12 and 13; MAP 28.

Lechea intermedia Leggett was included in the broadly interpreted *L. minor* from the time of Linnaeus until Leggett and Britton[1] separated it. Britton has discussed the problem of typification of *L. minor* L. The generalized and meagre descriptions of the American authors following Linnaeus and to the time of Leggett served to separate *L. minor* (*L. thymifolia* Michx.), *L. villosa* and usually *L. tenuifolia* and *L. racemulosa*. The somewhat similar, probably closely related, eastern species, *L. intermedia*, *L. Leggettii* and *L. maritima*, and occasionally *L. racemulosa* and *L. tenuifolia*, were, during this time, placed together as the polymorphic species, *L. minor*. There is virtually nothing in the descriptions of any of the earlier authors to enable one exactly to place a specimen of any of the first three. Hooker,[2] obviously by the range given, had *L. intermedia* at hand but the description does not prove it. Robinson[3] states that the *L. minor* Lam. "is a poor and dubious sketch." My own study of the figure leaves me with an equally indefinite idea of what Lamarck meant. It is best to drop this from the synonymy of any of the species of the genus.

Lechea intermedia var. *juniperina* was proposed as the species *L. juniperina* by Bicknell in 1897.[4] He studied it particularly in the immediate vicinity of York, Maine, and made numerous collections from there. He noted some rather striking differences between it and typical *L. intermedia*, despite the fact that he had, presumably, never seen var. *juniperina* as it occurs in late autumn when fully mature and with its most outstanding characteristics revealed. Late in the fall, when the capsules are completely ripe and their valves separate and spread very broadly, this variety, as I have seen it along the coast from Penobscot Bay to southern New Hampshire appears to be distinct enough, at times, to justify Bicknell's evaluation of it. The numerous intergrades, however, between it and typical *L. intermedia*, and the fact that, until nearly complete maturity, the two are hardly separable, except by minute and obscure characters, compel me to regard *L. juniperina* as a variety of *L. intermedia*. The presence of like characters (similarity in shape, number and markings) in seeds of both is the most convincing proof, to me, of their close relationship.

The most important diagnostic characters are, the narrowly ovate and acute to subacute interior sepals, the globose capsule which is ex-

[1] Bull. Torr. Bot. Cl. xxi. 252 (1894).
[2] Fl. Bor. Am. i. 72 (1830).
[3] Gray, Syn Fl. N. Am. i[1]. 193 (1895).
[4] Bull. Torr. Bot. Cl. xxiv. 88 (1897).